WINTER 2002 VOL. 12, NO. 1

Edge

THE NATIONAL SOCIETY OF BLACK ENGINEERS PRE-COLLEGE MAGAZINE

Planning Your Engineering Career Today

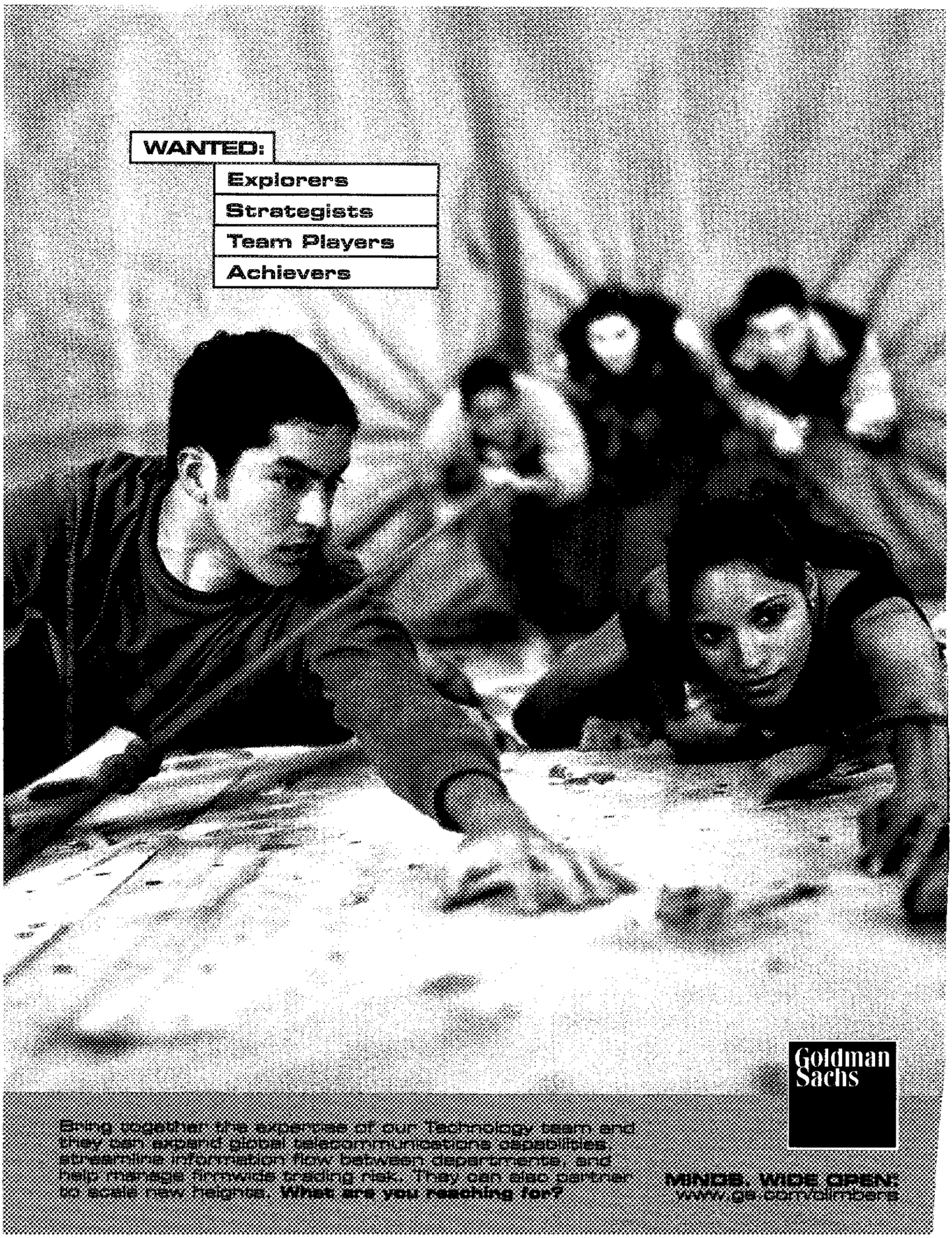
Bringing Out the Engineer in You

Engineering to Avoid Disaster
Evaluating Structures to Save Lives

Engineers in Action
Philip Emeagwali, Inventor of the Super Computer

Cram Session
Become a Master Student

National Engineers Week Multicultural Issue



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PRE-COLLEGE INITIATIVE PROGRAM

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NSBE Jr. is a membership category for pre-college students. It allows NSBE collegiate and technical professional members to encourage pre-college students to develop interests and skills in math and science.

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Start a Chapter at your school today!

Society of Manufacturing Engineers Education Foundation
Society of Women Engineers
Women in Engineering Programs & Advocates Network

American Institute of Mining, Metallurgical, and Petroleum Engineers

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For more information on NSBE Jr. and PCI Programs:

Internet: www.nsbe.org
e-mail: pci@nsbe.org

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Programs Coordinator—NSBE
1454 Duke Street
Alexandria, VA 22314
703-549-2208 ext.305
703-683-5312 FAX

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National Society Of Black Engineers

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For more information, visit www.nsbe.org.

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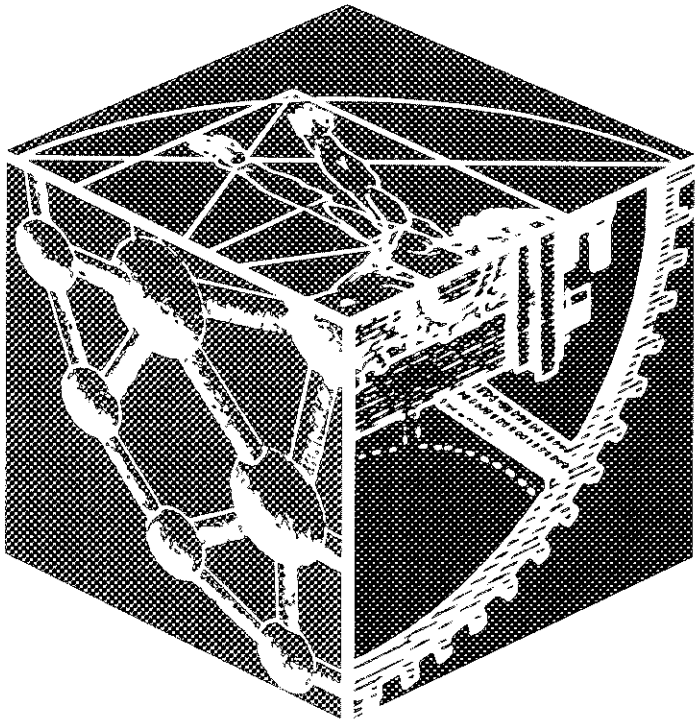

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Society of Allied Weight Engineers
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SPIE – The International Society for Optical Engineering
Standards Engineering Society
Triangle Coalition for Science and Technology Education
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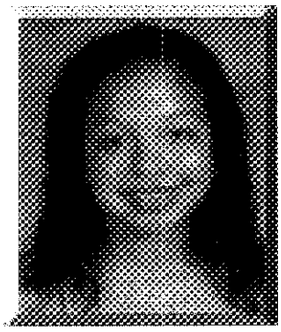
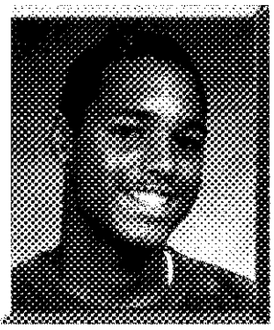


Jessica Torres
9th Grade
California Academy of Math and Science
Carson, California

Q: How does engineering prevent a shaking building from collapsing?
A: Engineering is involved in everything around us. Engineers work to ensure that buildings will be able to withstand a certain degree of force, with redundancy safeguards to prevent a sudden collapse. Buildings may be constructed in a way that provides multiple support systems.



Howard Allen Hamilton III
11th Grade
Eleanor Roosevelt High School
Greenbelt, Maryland

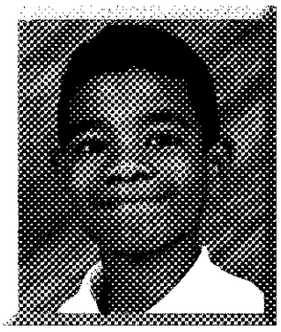
Q: If engineers were given the opportunity to rebuild the World Trade Center, what would they do differently?
A: Engineers have played an important role in building safety. Many things have improved since the World Trade Center was built. Many engineers are currently studying the site to determine ways to ensure that even more lives can be saved.

Alyssa Bowman
6th Grade
Manchester Middle School
Chesterfield, Virginia

Q: How much money do engineers make?
A: Salaries for engineers vary depending on the specific discipline and job market demand. Typically, starting salaries for engineers are higher than most fields. Starting salaries for engineers can range from $40,000- $60,000, depending on whether you took advantage of internship opportunities while in college.

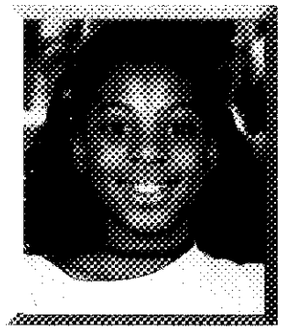
Natasha Levett
12th Grade
Robinson High School
Tampa, Florida

Q: What special training is needed to become an engineer and how many years of school is required?
A: There are many engineering disciplines that students may pursue in college. Though the discipline chosen and other factors impact the length of time it takes to complete your degree, typically, full-time engineering study will take about five years. You should also expect to complete internships offering "real-life experience."



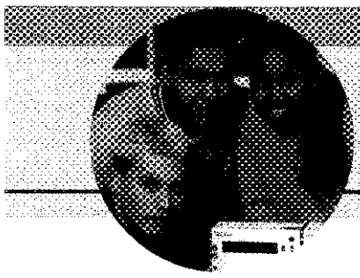
Bryce Lawrence Williams
9th Grade
Slidell High School
Slidell, Louisiana

Q: How does drafting fit into engineering?
A: Drafting is a critical tool used in engineering from job and design consultation, to working drawings and blueprints. While studying engineering, you may have the opportunity to take Computer-Aided Design classes or CAD frequently used in designing cars.



Amberly Ellis
7th Grade
Sudbrook Middle Magnet School
Pikesville, Maryland

Q: Are there more men in engineering than women?
A: Yes, unfortunately women are significantly underrepresented in engineering. There are a number of reasons for this including a lack of role models and awareness of engineering opportunities across the disciplines. However, there are many women engineers who are making outstanding contributions.



Coursay

NSBE:

Easing the Transition from High School to College

by Nattasia Chaney

It was only a few years ago that I was in high school, and my coursework came really easy. I breezed through my math and science courses, and I graduated in the top of my class. During my freshman year of college, I didn't expect the classes to be much different from those I had taken in high school. I knew that my favorite classes were math and chemistry, and I couldn't wait to take those courses.

By the end of my first semester, vacation could not come soon enough. Those were the hardest five months that I had ever experienced, and I knew it would only get harder. I had no knowledge of how to manage my time or how to study for courses, and I had way too much pride to get help from a tutor. What was I to do?

One day while eating lunch, I was approached by an upperclassman. He asked how my semester was going, and I told him that I was not prepared for the transition from high school to college. I asked him how he managed to get through, and that's when I learned about NSBE. I immediately signed up and paid my dues. At my first meeting, other members talked about their difficulties with coursework and professors. The NSBE members who were upperclassmen offered to be tutors and mentors. By the end of my first year, I saw a significant change in my grades.

During my second year, I got involved with my chapter's PCI program. At the time, we had one NSBE junior chapter and we assisted them with their homework and SAT/PSAT Prep. I really wanted to get involved with PCI because I didn't want another student to go through what I went through.

I wanted to be able to tell them to take advanced placement courses. I also wanted to tell them that it was never too early to start preparing for SAT/PSAT. I also wanted them to know that there were services and organizations such as NSBE that were able to assist them. I became the PCI chair of my chapter. We educated lots of students and increased the number of NSBE junior chapters. I am always pleased to see students who were once a part of the PCI program become active NSBE members. The moral of the story is that I would probably not be writing to you, nor would I be on my way to becoming a chemical engineer, if it were not for NSBE. Now, NSBE is expanding its resources and adding more programs that will assist pre-college students in achieving their goal of becoming engineers.

Nattasia Chaney
National Pre-College
Initiative Chair

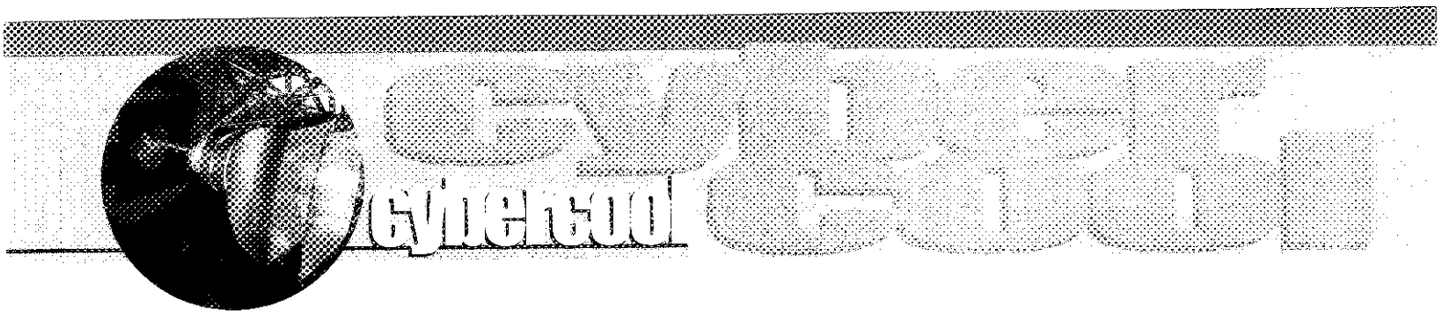
NSBE has joined forces with US FIRST, an organization designed to get pre-college students involved with technical projects in a team environment.

Pre-high school students can now receive lots of help with their math homework. NSBE and Mathcounts have collaborated to provide assistance with math via the Web. Mathcounts also provides mathematical tools and games that make learning math fun. Check it out at www.nsbe.org (under the Pre-College link).

Learning math, science and black history pays off in our Try-Math-A-Lon competition. This Jeopardy-style competition takes place during the Spring Regional conference in each region, and winners compete for big prizes at the National Convention.

We encourage students to make sure they submit applications for the various scholarships and awards provided for PCI students.

I hope that this edition of the *NSBE Bridge* provides you with information that will assist you in becoming an engineer. Best wishes to you in your studies.



www.figurethis.org
Looking for a way to have some fun while testing your knowledge, then you'll like this Web site. The "Figure This" Web site provides mathematics challenges, and tests your knowledge in algebra, geometry, measurements, statistics and probability. This site is funded by the National Science Foundation and the U.S. Department of Education.

www.muohio.edu/Dragonfly/
Learn how to make a model of the sun or explore the genetic code on this site that offers something for everyone. Project Dragonfly is a collaborative effort at Miami University (Oxford, Ohio) started with funding from the National Science Foundation.

www.number2.com
This Web site provides free SAT/ACT preparation, including a tutorial and vocabulary builder. Challenge yourself with the "Question of the Day."

www.pbs.org & www.zoom.org
These are two fun sites sponsored by PBS, which includes PBS kids are ready to learn and also PBS kids fun page.

www.madsci.org/
The "network" provides a forum in which people can learn more about the world around them. This site has three primary divisions: 1) Ask-A-Scientist: Includes the online archive of questions and answers, 2) MAD Labs: More about having fun with science; and 3) MadSci Library: Locate science sites and resources on the World Wide Web. Includes links to other Ask-A-Scientist sites and information about careers in science.

http://kidscience.about.com/kids/kidscience/
Pandas, tigers, and frogs: what do these three species have in common? You'll find a number of interesting scientific questions discussed here. Study Hawaii's volcanoes or chat about science.

www.InnerBody.com/htm/body.html
Welcome to Human Anatomy Online, the place for fun, interactive, and educational views of the human body. This program contains more than 100 illustrations of the human body with animations and thousands of descriptive links. Java enhanced.

http://www.thetech.org/robotics/
Interested in robots? You'll learn about their history and how they make our lives easier. The Tech Museum of Innovation offers this Web site for upper elementary/middle school students, providing articles on history, ethics and innovation in the field of robotics. Videos, interactive games and interviews with people in the field make this site especially effective.

http://www.cotf.edu/ete/modules/msese/explorer.html
His name's Explorasurus, and here is the deal: He'll teach you of a time on Earth when the dinos were real. We'll travel the world, and we'll travel through time. We'll find out the dinosaur's reason and rhyme. This is a virtual earth science museum.

Whether researching a topic for school or discovering the mysteries of science, you'll discover an untapped world on the Internet. We've identified a few interesting Web sites that may be of interest to you.

POP Quiz

MINORITY ACHIEVERS

Prepared by Brooke A. Williams

Match the name of each minority achiever with their description. Use the answers below and see how well you know your history!

Jane Cooke Wright
Mae C. Jemison
Guion S. Bluford
Henry Sampson
Mario Molina
Patricia Bath
Jan Ernest Matzeliger
Ely Samuel Parker
Madame C. J. Walker
Susan Lafleshche Picotte

1. A mission specialist on the Space Shuttle *Endeavour*, she made history in September 1992 by becoming the first African American woman in space. She studied chemical engineering and African American studies at Stanford University while participating in theater and dance. Today she has combined her knowledge of engineering and medicine to fuel one of her current projects that focuses on improving healthcare in Africa.

2. Born in Jackson, Mississippi, this man's inventions included a new process for making rocket fuel, a gamma electric cell that converts gamma radiation into electricity, and the common household product Super Glue. He is currently an engineer for the Aerospace Corporation in California.

3. Her father was a doctor and she performed extensive research on cancer drugs with him at the Cancer Research Foundation at Harlem Hospital. She tested several different "families" of anticancer drugs. She is recognized for commitment to attempting to discover a cure for cancer.

In 1883, this black Massachusetts shoemaker invented a complicated machine that manufactured an entire shoe and attached the upper portion of the shoe – the form to the bottom part – the sole. The invention revolutionized the industry and cut manufacturing costs in half. In the same year he received a patent for his product.

She was the first Native American medical doctor. She graduated at the top of her class from the Women's Medical College of Pennsylvania. Later, she served the medical needs of the Omaha tribe, her father being the Omaha's last recognized chief. She went on to become a national advocate for improved health practices for all Native Americans.

The first African American man in space, this astronaut has spent more than 688 hours orbiting the galaxy. The son of an engineer and a teacher, he defied his high school guidance counselor's suggestion to skip college and chose instead to study aerospace engineering at Pennsylvania State University.

This woman invented the laserphaco probe, a device that removes cataracts from people's eyes. Doctors aim the laserphaco's probe beam exactly where they want it and the laser breaks up the cataract without hurting any other part of the eye. She was the first African American female doctor to earn a patent for a medical invention.

A former wash woman, she developed the "Wonderful Hair Grower" creme in 1895 that conditioned and healed African American hair. She stated that the formula for the revolutionary product was revealed to her in a dream. She developed it and sold it to other women, and quickly became the first American woman of any race to become a millionaire through her own efforts.

This man's work studying air pollution earned him a Nobel Prize in 1995. Born and raised in Mexico City, one of the most polluted cities in the world, it is not surprising that he is one of the world's most knowledgeable experts on pollution and the effects of chemical pollution on the environment.

The first Native American engineer, this man was also a dominant figure in U.S./Indian affairs. He helped extend the Genesee Valley Canal towards the Allegheny River. He also served as General Ulysses Grant's military secretary and was the first Native American to serve as U.S. Commissioner of Indian Affairs.

ANSWERS:
1. Jemison 2. Sampson 3. Wright 4. Matzeliger 5. Picotte 6. Bluford 7. Bath 8. Walker 9. Molina 10. Parker

Join the National Society of Black Engineers to Help Bridge the Digital Divide

NSBE Technical OutReach Community Help (T.O.R.C.H.) Program

Our Program

The T.O.R.C.H. Program is designed to increase the number of currently under-served communities who have access, technical assistance and skills, to receive value from digital technology (computers, Internet, hardware and software).

nsbe T.O.R.C.H. centers

The NSBE T.O.R.C.H. Centers are located in the pulse of the community and serve as training stations. Centers are now located in Alexandria, Va.; Washington, DC; Atlanta, and Chicago.

T.O.R.C.H. centers provide:

Access to computer technology
Skills to use and navigate new technologies
Values are emphasized as it relates to computer literacy
Content information makes surfing the Internet easier

NATIONAL SOCIETY OF BLACK ENGINEERS
T.O.R.C.H. PROGRAM
TECHNICAL OUTREACH COMMUNITY HELP

how you can become involved:

- Write letters to legislators, academic leaders and community leaders to make the digital divide a priority.
- Start or volunteer at a computer center in your local area using a curriculum provided by NSBE.
- Join NSBE's Strategic Alliance Program with organizations with the same goal as NSBE T.O.R.C.H.
- Teach a child or family member what you know about computers and make them aware of resources.

The T.O.R.C.H. Program is a national, multi-year initiative embracing creative solutions for a critical community problem.

Join our effort!

Take the T.O.R.C.H. Challenge!
For more information on starting a T.O.R.C.H. Center near you, visit www.nsbe.org, send e-mails to torch@nsbe.org or contact:

The National Society of Black Engineers
T.O.R.C.H. Program
1454 Duke Street
Alexandria, VA 22314
(703) 549-2207

Become a Master Student

Turning Average Grades into Honors

Making the grade isn't always easy. But if you have aspirations of becoming an engineer, astronaut or computer scientist, a solid foundation in math and science is essential. Let's face it, the competition will be tough and the curriculum will be rigorous – but the journey can be very rewarding. So even if you haven't been working up to your full potential, it's not too late to become a master student. History is sprinkled with success stories of people who turned themselves around through persistence and hard work. And that is exactly what will be required of you.

"Students who achieve high grades have something in common: They keep their eyes on the prize and understand that good grades help open doors," said Grace E. Mack, coordinator of recruitment and retention in the School of Engineering at Morgan State University in Baltimore, Md.

"Students who do well believe they can do anything, do more than is required to 'just get by,' and always, always, do their best. Master students see failure as a challenge to do better. They never give up!"

If you're ready to make a change, then you need to know that improving your grades requires a systematic and committed approach to tackling new material and a routine that includes planned study time.

Remember, you're not in this alone. Your teachers, counselors, and parents are available to assist you if you run into trouble.

Whether you like it or not, you need good grades to enter the college of your choice. After graduation, when you apply for a job, employers will look at your transcripts to see how well you did in college. Indeed, grades are a measurement of potential. Decisions about your courses, college acceptance and your future will be made based on school performance. But on the bright side, those making decisions also take into consideration significant grade improvements.

"Most engineering freshman enter college without a scholarship," Mack said. "Many earn a scholarship by working hard, staying focused and sticking with their three best friends: a faculty advisor, an upperclassman role model and tutoring."

One area that affects many students is test-day anxieties. Many people get a little skittish on test day, but that doesn't mean that you can't sharpen your test-taking skills. Exams measure both your ability to remember facts and figures and your understanding of information. If you've been preparing all along, a good night's sleep and a healthy breakfast will serve you well.

by Dianne W. Hayes

To debunk a myth, pulling all-nighters to cram for an exam is not the way to go. Not only will you be sleep-deprived, but you'll be trying to make up for months of work in one night. Instead, you can begin today to make some important changes in how you approach study.

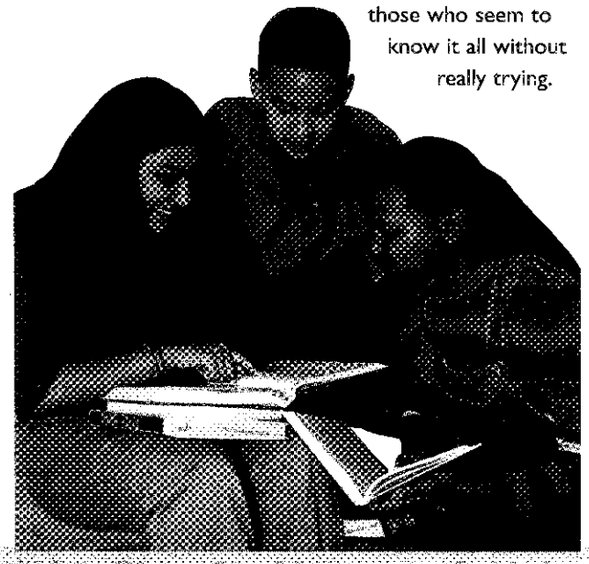
Independent and Group Study is Key

There is an appropriate time for group study, sharing with partners and quizzing one another. But there is no substitute for studying alone on a daily basis. Even if you don't have a particular homework assignment, it's a good idea to review materials, reread chapters and do practice math problems. Practice makes perfect, and that holds true for developing good study habits. Remember to turn the music and television off.

You will need to be sure that you've mastered each area. Be honest with yourself if there is an area that you're having trouble with or feel unsure about.

Create a Plan of Attack

If you want it, go for it! Good grades are not only for those who seem to know it all without really trying.



Making the grade requires organization, preparation and determination. In addition, you should also keep in mind that class participation is an important part of your plan for academic success. Being preparing for class and asking questions will not only show your teacher that you're into the subject, but you may even surprise yourself with how much you know. It's also a good way to assess the areas that are giving you trouble.

Your plan of attack should include the following:

- Schedule daily study time
- Take good, clear notes in class
- Take advantage of extra credit work
- Identify a quiet place to study in your home
- Begin papers and special assignments in advance
- Make sure you are on time and that you attend school regularly
- Seek tutoring and ask questions if you're having trouble
- Find a study partner who is serious about improving grades
- Keep your notebooks and assignment sheets well organized
- Don't procrastinate! Don't procrastinate! Don't procrastinate!

Procrastination is Your Enemy

Putting off until tomorrow what you can do today really doesn't work. In fact, when it comes to studies, you are setting yourself up for failure. Not only does the work compound, but you've cheated yourself out of important study time. Even when the information comes easy to you, you will still want to review information on a regular basis before exams (a habit that will serve you well in college).

Seek Help When Needed

Everyone hits a bump in the road along the way. Maybe you're good in English, but find math more challenging. Instead of shrinking, seek help.

Get help from your guidance counselors, teachers and parents. They may be more helpful than you might think. They would be more than happy to take extra time with you to discuss your concerns regarding school and college preparation. Once you show that you're interested, you may be amazed at the amount of support you will receive.

Take advantage of "Shadow Day" programs, where you can visit the type of business in which you'd like to work. Sign up for mentor programs and attend programs where engineers or technical professionals are available to answer questions about what they do and how they prepared for their careers.

Becoming a master student is not as hard as you may think. Whether you are already on the honor roll or need remedial work to get back on track, it all begins today. Changing habits, becoming more disciplined and taking advantage of resources are the keys to improving grades and laying a solid foundation for your future.

Web Sites for Homework Help

***Homework Help**
Volunteer teachers will help get you through some of your hardest problems. www.startribune.com/stonline/html/special/homework/

***Discovery Channel**
Click on the students' section and you'll find tutors, brain boosters and other interesting activities and reference information to help you with homework and just for fun. http://school.discovery.com/

***Ask Dr. Math**
Your math questions answered!
www.forum.swarthmore.edu/dr.math/

***Science Daily**
Read recent articles on scientific discoveries.
www.sciencedaily.com/index.htm

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NSBE 2002

We cordially invite you to visit us during the NSBE 2002 National Conference in Orlando, Florida, at the following events: **Career Fair, Student Network Reception, Health Fair, J&J Sponsored Workshop.**

Johnson & Johnson

T. C. Williams High School Remembering the Titans and NSBE Jr.

by Brooke A. Williams

Millions of people are already familiar with the spirit of T.C. Williams high school from the movie "Remember the Titans," starring Denzel Washington that told the story of the school's integration through members of its notorious football team. Located in Alexandria, Virginia, T.C. Williams high school has a long history of excellence and a student spirit of perseverance. From their blockbuster Disney movie to their continued victories in the academic world, T.C. Williams students demonstrate their ability to be successful over and over again.

T.C. Williams is one of the most respected, comprehensive high schools in the country. Its facilities and its students compare favorably with the best private schools. With a "going to college" rate of 84 percent, students from the class of 2001 have been admitted to more than 100 colleges and universities. T.C. Williams is unique in that it is the only high school in the city of Alexandria. The school is home to 2,030 students with a diverse background that includes 43.2 percent African American; 7.4 percent Asian Pacific; 21.6 percent Hispanic; .3 percent Native American, and 27.5 percent White. T.C. Williams offers a curriculum of 188 courses and is one of the few Virginia schools that teaches organic chemistry.

The Science Bowl Team at T.C. Williams, under the direction of Manu Patel, Ph.D., the Advanced Placement physics teacher, placed first in the Virginia Division of the Department of Energy Science Bowl Competitions in 1998 and 1999. The Science Bowl is a question-and-answer quiz show format competition that tests student's knowledge of the sciences.

Standing R. to L.: Mackenzie White, Maria Portobenco, John Nunn, teacher; Renea McKinney, Timothy Nunn, Brien Hughes, Gina Isenberg. Kneeling R. to L.: Jabari Baker, Walter Salgado, Roger Lizarraga.

Questions range from astrology to zoology and include computer science as well. There are five students on the team with one rotating alternate. Preparation for the Science Bowl is intense. Students practice at school, at home, and on the weekends.

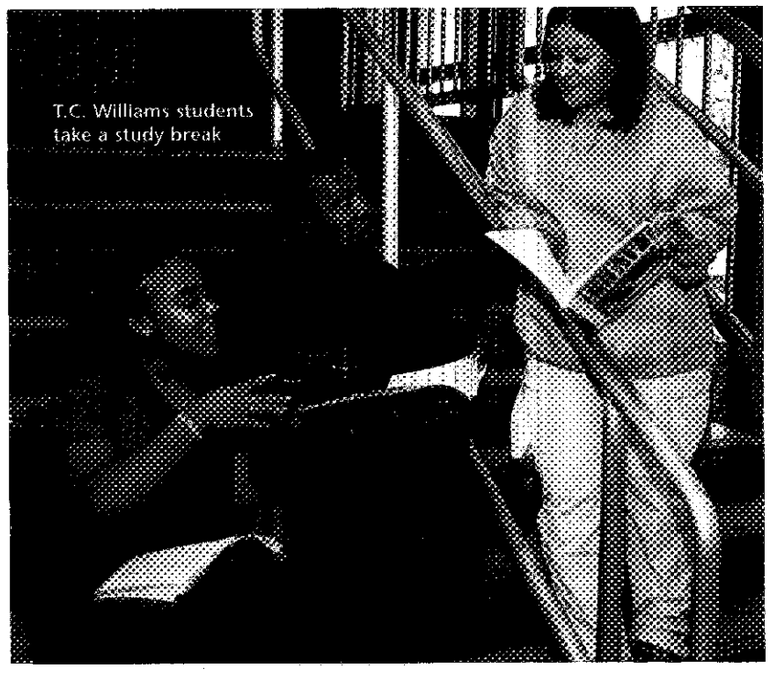
In addition to the Science Bowl, T.C. Williams students also participate in the Physics Bowl, which is a national test given by the American Association of Physics Teachers and Medtrologic Lasers. For the last three years, students from T.C. Williams have placed first or second in the region, and five years ago they had the only student in the country to earn a perfect score on the test.

Even T.C. Williams teachers have been recognized for their achievements in the sciences. David Keener, Advanced Placement Biology teacher was named the Virginia Presidential Science/Math Teacher of the Year. The award is presented based on a teacher's approach to education and his or her effectiveness in the classroom. In addition, T.C. Williams' Louis Kokonis has recently been awarded Math Teacher of the Year by the Virginia Council of Teachers of Mathematics.

The Technology, Engineering, Mathematics, and Science (TEMS) program for Alexandria City, organized by teacher John Nunn two years ago, encourages students to stay with math as it gets progressively more difficult. The program also prepares students to visit colleges such as Penn State, and Tennessee State University and MIT and to participate in pre-college engineering programs. The program is also key in providing mentors for students and allowing them to shadow professionals in the science and technology world. "TEMS gets students out of their community and into a new environment," said Nunn. The summer TEMS program targets rising 7th and 8th graders, while during the school year TEMS is open to 10th and 12th graders. Participants hear from guest speakers and participate in tours and workshops. "It helps get students connected to what is around them," said Nunn, who is also the NSBE Jr. advisor. "There is a big interest in math and science in this school. It is just a matter of plugging the potential with the resources. The students at T.C. Williams have a general, broader exposure to science in the classrooms, but programs such as TEMS and NSBE Jr. provide a more specialized focused approach."

The NSBE Jr. Chapter at T.C. Williams is distinctive because it is a combination of four schools: Minnie Howard Ninth Grade Center, George Washington Middle School, and Francis C. Hammond Middle School, and T.C. Williams. The pooling of the schools provides for a richly varied foundation on which to build.

At the helm of the T.C. Williams NSBE Jr. Chapter are two highly motivated students with a quest for learning and a drive to succeed. Hassen Abdu, a 17-year-old senior with a strong interest in electrical engineering, is chapter president. Abdu received his motivation from a summer experience at the Minority Introduction to Engineering, Entrepreneurship and Science (MITE ^{2} S) program at the Massachusetts Institute of Technology. He has also won Titan Pride Awards in the areas of electronics and computer electronics. Samir Abdosh is a 17-year-old senior who serves as vice president. His interest is mechanical engineering and he has won a Titan Pride Award for excellence in engineering drawing. Both students enjoy the networking opportunities that NSBE Jr. allows them. "I enjoy the opportunity to meet members of the industry," Abdosh said. "It is a great chance to establish relationships with people." Hassen and Samir are eager to get the NSBE Jr. Chapter up and active and are looking forward to participating in the competitions and attending the NSBE convention.


T.C. Williams students take a study break

There are other seasoned members of the T.C. Williams NSBE Jr. Chapter who share the enthusiasm of their president and vice president. Renea McKinney and Brian Hughes are both seniors who attended the NSBE National Convention in Indianapolis last year. "I liked meeting all of the engineers," McKinney said. "It made me realize all the opportunity in this field."

Hughes enjoyed the networking aspect of the convention. "I spoke to different colleges and college members of NSBE," he said. "They told me about the math and science classes that I should be taking while I am in high school to be better prepared for college courses." He was especially impressed and motivated by the minority and women engineers present at the convention. Hughes figured, "If they can be engineers, I can too."

T.C. Williams is a high school that is buzzing with talent. The students there have a strong drive to succeed and powerful school pride. "I encourage my students to get involved at T.C. Williams," explains Principal John Porter, "The more that they do academically here, the better they will do in college."

Finding money for college doesn't have to be a painful experience. There are numerous scholarships available if you know where to look. Check out the information below to get a head start on your search for financial assistance.

Intel Science Talent Search

Eligibility: Satisfactory academic standing is required to retain scholarship. Applicant must be in the last year of secondary school, and enter the competition by submitting a written report on an independent research project in science, mathematics or engineering, along with standardized test scores, transcript and official entry form.
Award: $100,000 4- year scholarship (1st place), $75,000 4-year scholarship (2nd place), $50,000 4-year scholarship (3rd Place).
Contact: Science Service, Inc.
Science Education Programs
1719 N Street, NW
Washington, DC 20036
(202) 785-2255
Deadline: May 15, 2002
Web site: www.sciserv.org

Thurgood Marshall Scholarships

Eligibility: African Americans who are U.S. Citizens, 3.0 GPA, 1,000 SAT or 24 on the ACT, and attending an HBCU.
Award: The amount awarded varies, depending upon the availability of funds.
Contact: Thurgood Marshall Scholarship Fund
100 Park Avenue, 10th Floor
New York, NY 10017
(212) 878-2221
Deadline: Dates vary by school. Check with HBCU you want to attend.
Web site: www.thurgoodmarshallfund.org

American Chemical Society Scholars Program

Eligibility: High school seniors planning to enter college in the following fall. Applicants must be African American, Latino, American Indian or Alaskan Native. Selection is based on academic merit and financial need.
Award: Scholarships up to $2,500 per year
Contact: American Chemical Society
Attn: Membership Division
1155 16th Street, N.W.
Washington, D.C. 20036
(202) 872-6250
(800) 227-5558
Fax: (202) 776-8003
Deadline: February 15, 2002
Web site: www.acs.org

Engineering Vanguard Program Scholarships

Eligibility: Students from inner city high schools in participating cities who are bypassed by conventional university recruiting.
Award: Provides full payment of tuition and room costs at participating university.
Contact: National Action Council for Minorities in Engineering (NACME)
Attn: Director, Academic Programs
350 Fifth Avenue
Suite 2212
New York, NY 10118-2299
(212) 279-2626
Deadline: Octtober 26, 2002
Web site: www.nacme.org

Society of Women Engineers (SWE)

Eligibility: Female student enrolled in or planning to enroll in an engineering program at a four-year institution. Must be a U.S. citizen.
Award: Up to $2,000
Contact: Society of Women Engineers
Scholarship Information
230 E. Ohio St.
Suite 400
Chicago, IL 60611-3265
(312) 596-5223
Deadline: Postmarked May 15, 2002
Web site: www.swe.org

William R. Hearst Techforce Endowment Scholarship

Eligibility: African American, Latino or American Indian high school students committed to pursuing an undergraduate engineering degree.
Award: $2,500 per year (renewable)
Contact: National Action Council for Minorities in Engineering
350 Fifth Avenue
Suite 2212
New York, NY 10118-2299
(212) 279-2626
Deadline: December 1 of each year
Web site: www.nacme.org

Minority Undergraduate Scholarships for Physics

Eligibility: Minority high school seniors, college freshmen or sophomores, planning to major in physics.
Award: $2,000
Contact: American Physical Society
Attn: Minority Scholarships
One Physics Ellipse
College Park, MD 20740-3844
(301) 209-3232
Deadline: First Friday in February
Web site: www.aps.org/educ/com/index.html

Society of Hispanic Professional Engineers Foundation

Eligibility: Hispanic students who are interested in studying engineering or science.
Award: $500-$7,000
Contact: Director of Educational Programs
Society of Hispanic Professional Engineers Foundation
5400 E. Olympic Boulevard, Suite #210
Los Angeles, CA 90022
(323) 888-2080
Deadline: April 15th of each year
Web site: www.shpefoundation.org

(AISES) Burlington Northern Santa Fe Foundation Scholarship

Eligibility: High school seniors residing in states serviced by the Burlington Northern and Santa Fe Pacific Corporation and its affiliated companies: AZ, CO, KS, MN, MT, NM, ND, OK, OR, SD, WA, San Bernadino County in California. At least 1/4 American Indian/Alaskan Native and/or is recognized as a member of a federal recognized tribe.
Award: $2,500, which is renewable each year depending on student's standing.
Contact: AISES (American Indian Science and Engineering Society
2201 Buena Vista, S.E., Suite 301
Albuquerque, NM 87106
(505) 765-1052
Deadline: April 15, 2002
Web site: www.AISES.org

Northrop Grumman Scholarships

Eligibility: Entering freshman women majoring in engineering or computer science at an accredited school, college, or university.
Award: $1,500 or $1,000 per year
Contact: Society of Women Engineers
230 E. Ohio Street
Suite 400
Chicago, IL 60611-3265
(312) 596-5223
Deadline: May of each year
Web site: www.swe.org

Information Handling Services/SAE Women, Engineers Committee Scholarships

Eligibility: High school women or minorities who are seniors with a 3.0 GPA and accepted into an accredited engineering program.
Award: $1,500
Contact: Society of Automotive Engineers
Attn: Education Relations
400 Commonwealth Drive
Warrendale, PA 15096-0001
(724) 772-8534
Deadline: Dec. 1, 2002
Web site: www.sae.org

Engineering & Science

FIRST Robotics Competition (For Inspiration and Recognition of Science and Technology)
The FIRST Robotics Competition is a national, annual design competition that brings professionals and young people together in teams to solve an engineering design problem in an intense and competitive way.
For more information, visit: www.usfirst.org

Have you ever had a great idea and didn't know quite what to do with it? Well, there are hundreds of competitions held each year that can turn your great idea into scholarships, prizes, grants and trips. Now is the time to combine your interest in engineering, science and math with opportunities to present your ideas and change your school or community.

International Bridge Building Contest
The object of this contest is to see who can design, construct and test the most efficient bridge within the specifications. By participating, students get a flavor of what it is to be an engineer, designing structures to set requirements and then seeing them perform their function.
For more information, visit:
www.iit.edu/~hsbridge

Odyssey of the Mind
The Odyssey of the Mind teaches students to learn creative problem-solving methods while having fun in the process. The worldwide program promotes creative team-based problem solving for students from kindergarten through college. Schools may enter one team per problem per division into the competition. Teams compete at the regional, state and country level. Teams that advance are eligible to attend the annual Odyssey of the Mind World Finals, usually held on a U.S. university campus.
For more information, visit:
www.odysseyofthemind.com

BEST Robotics Inc.
BEST Robotics was established in 1997 as a national nonprofit organization whose purpose is Boosting Engineering, Science, and Technology among precollege students. Team participation is open to all interested students, and participation is without fee to the students or the schools.
For more information, visit:
www.bestinc.org

Future City Competition
The mission of the National Engineers Week Future City Competition is to provide a fun and exciting educational engineering program for seventh and eight grade students that combines a stimulating engineering challenge with a "hands-on" application to present their vision of a city of the future.
For more information, visit:
www.futurecity.org

Destination Imagination
This competition teaches students that there is more than one way to solve a problem in the real world. Teams of up to seven members choose one challenge and spend several months perfecting their "solution" for tournament day. Teams also hone their on-the-spot problem solving skills as they practice coming up with solutions for Instant Challenges.
For more information, visit:
www.destinationimagination.org/

Competitions

MATHCOUNTS

The nationwide math coaching and competition program is for middle school students. It promotes student interest in math by making math achievement as challenging, exciting and prestigious as a school sport. Beginning each fall, thousands of teachers and volunteers coach students to compete in state competitions. The top four individuals advance to the National Competition.
For more information, visit:
www.mathcounts.org

Pre-College (PCI) Science Fair

The National Society of Black Engineers (NSBE) offers science fairs as a venue for pre-college students to display their creativity and scientific abilities. Regional competitions are held during NSBE Spring Regional PCI Conferences. Students in middle, junior and high school are able to participate. Participants are required to document their projects in a formal report. First place winners from each level (middle, junior, and senior) receive financial support to compete in the National PCI Science Fair to earn top prizes.
For more information, visit:
www.nsbe.org

Try-Math-A-Lon Competition

The National Society of Black Engineers (NSBE) sponsors the Try-Math-A-Lon mathematics competition for high school juniors and seniors. The purpose of the contest is to help groom students for success on the mathematics portion of the ACT and SAT tests and in college freshman math/science courses. The top students who compete on the regional level are given the opportunity to compete at NSBE's National Convention.
For more information, visit:
www.nsbe.org

Bayer/NSF Award for Community Innovation

This competition is for teams of middle school students (sixth, seventh and eight graders) to find creative solutions to problems in their communities. The winning team will earn an all-expense-paid trip to Epcot at Walt Disney World Resort for National Championship Week. Students also compete for prizes, grants and savings bonds. One team, chosen from the top 10 finalist teams will win the $25,000 Columbus Foundation Community Grant to bring their proposal to life in their community.
For more information, visit:
www.nsf.gov/od/lpa/events/bayernsf/

The National Engineering Design Challenge (NEDC)

NEDC is an exciting high school engineering-based program, in which teams of students design, build and demonstrate a working model of a new product. NEDC challenges students to apply mathematics, science and technology to a real-world engineering situation. Through NEDC, students learn to use skills similar to those used by engineering team members.
For more information, visit:
www.jets.org/programs.htm

Summer Programs

Get a head start on your future through summer pre-engineering programs held throughout the country. Take advantage of an opportunity to learn more about engineering, participate in projects, meet working engineers and travel to companies where you may someday work. Some programs include travel and housing expenses.

NASA SHARP: Residential & Commuter Program

Talented high school students with a demonstrated interest in and an aptitude for math, science, engineering, or technology are encouraged to apply. As apprentices students receive a salary while working under the direction of a NASA mentor.

When: Eight weeks during the summer from June through August.
Where: Participating NASA Field Installations.
Who: Rising high school juniors and seniors who have been traditionally underrepresented – African Americans, Native Alaskan, Native American, Hispanic, Pacific Islander (Natives of the Philippines, Guam, American Samoa, or Micronesia), and person with disabilities that limit a major life function.
Cost: Free – Students are responsible for transportation to and from their site location.
Salary: GS1 grade level (commuter), minimum wage (residential).
Deadline: Jan. 30, 2002 (residential); Feb. 27, 2002 (commuter).
Contact: Lisa Williams
Modern Technology Systems, Inc.
6801 Kenilworth Avenue, Suite 200
Riverdale, MD 20737
Phone: (301) 985-5171
Web site: www.mtsibase.com/sharp

University of Virginia –Minority Introduction to Engineering (MITE)

The MITE program was established in 1987 and is designed to give rising high school juniors and seniors a broad, but comprehensive experience in the study of engineering.

When: July 14-20, 2002
Where: University of Virginia, Charlottesville, Va.
Who: African American, Native American, Hispanic and female students who are rising juniors and seniors.
Cost: Transportation
Deadline: April 18, 2002. Decisions are made by May 8, 2002.
Contact: Office of Minority Programs
Attn: Carolyn Vallas, Director
D-111 Thornton Hall
University of Virginia
Charlottesville, Va. 22904
Phone: (804) 924-0614
Web: www.cs.virginia.edu/~seas/

Michigan Technological University, Minorities in Engineering

A one-week workshop that deals with the exploration of six areas of engineering and applied technology through role model speakers, laboratory/field experiences and a group engineering project.

When: July 14-20, 2002
Where: Michigan Technological University, Houghton, Mi
Who: Minority students in grades 9-11, who demonstrate ability in mathematics or science.
Cost: $50, registration fee; transportation
Aid: 100 percent tuition, room and board provided.
Deadline: April 5, 2002
Contact: Michigan Technological University
John Lehman
Coordinator, Youth Program
Houghton, MI 49931
Phone: (906) 487-2219
Web: www.youthprograms.mtu.edu

New Jersey Institute of Technology, Summer Academy in Technology and Science

This five-week program offers up to eight college credits in small, customized classes taught by the faculty.

When: 5 weeks, July-August
Where: New Jersey Institute of Technology, Newark, NJ
Who: Students in the 10th-12th grades
Cost: $196/credit; $60 registration; $550 room and board (5 nights/week); $250 food, $50 application
Aid: Partial scholarships provided on a need-based and merit based
Deadline: May
Contact: Ms. Diana Muldrow
New Jersey Institute of Technology
Newark, NJ 07102
Phone: (973) 596-3679
Web site: www.njit.edu/PreCollege/student.html

EnviroTech -- High Tech Careers in Environmental Sciences (North Carolina State University)

The Envirotech camp is an opportunity for rising 10th and 11th graders to spend two weeks of their summer using computers and laboratory equipment to investigate the science behind the changes and processes in our environment.

When: June 16-29, 2002
Where: North Carolina State University, Raleigh, NC
Who: Rising 10th or 11th graders
Cost: $900
Aid: Some Scholarships available
Deadline: April 15, 2002
Contact: Beth Snoke
The Science House
North Carolina State University
Box 8211
Raleigh, NC 27695
Phone: (919) 515-8824
Web: www.science-house.org/student/envirotech/

Business Engineering Science and Technology-BEST (Eastman Kodak Company, Penn State University)

Business Engineering Science and Technology (BEST) is a four-week program for under-represented students of color. The goal of the program is to expose the students to business, engineering, and science education opportunities at Penn State and to career opportunities within Eastman Kodak Company.

When: July 10-August 7
Where: Penn State University, University Park, PA
Who: Minority students who are rising 12th graders residing in Pennsylvania or Rochester, NY.
Cost: None.
Aid: Successful completion will be rewarded with a stipend.
Deadline: April
Contact: Saundra D. Johnson, Director
Minority Engineering Program
Penn State University
241 Hammond Building
University Park, PA 16802
Phone: (814) 865-7138
Web: www.engr.psu.edu/mep

High School Summer Science Research Fellowship Program (Baylor University)

The High School Summer Science Research Fellowship Program at Baylor University offers high school students hands-on research experience by working with university science professors in many disciplines.

When: May 30-July 2, 2002
Where: Baylor University, Waco, TX
Who: Rising 12th graders
Cost: $400 (includes room and board); $425 (student fee).
Aid: Limited financial aid is available.
Deadline: March 1
Contact: Ms. Bernice Helpert, Administrative Assistant
Associate Dean for Sciences, College of Arts and Sciences
High School Summer Science Research Fellowship Program
Baylor University
P.O. Box 97344
Waco, TX 76798
Phone: (254) 710-4288
Web: www.baylor.edu/~Research/high_school.html

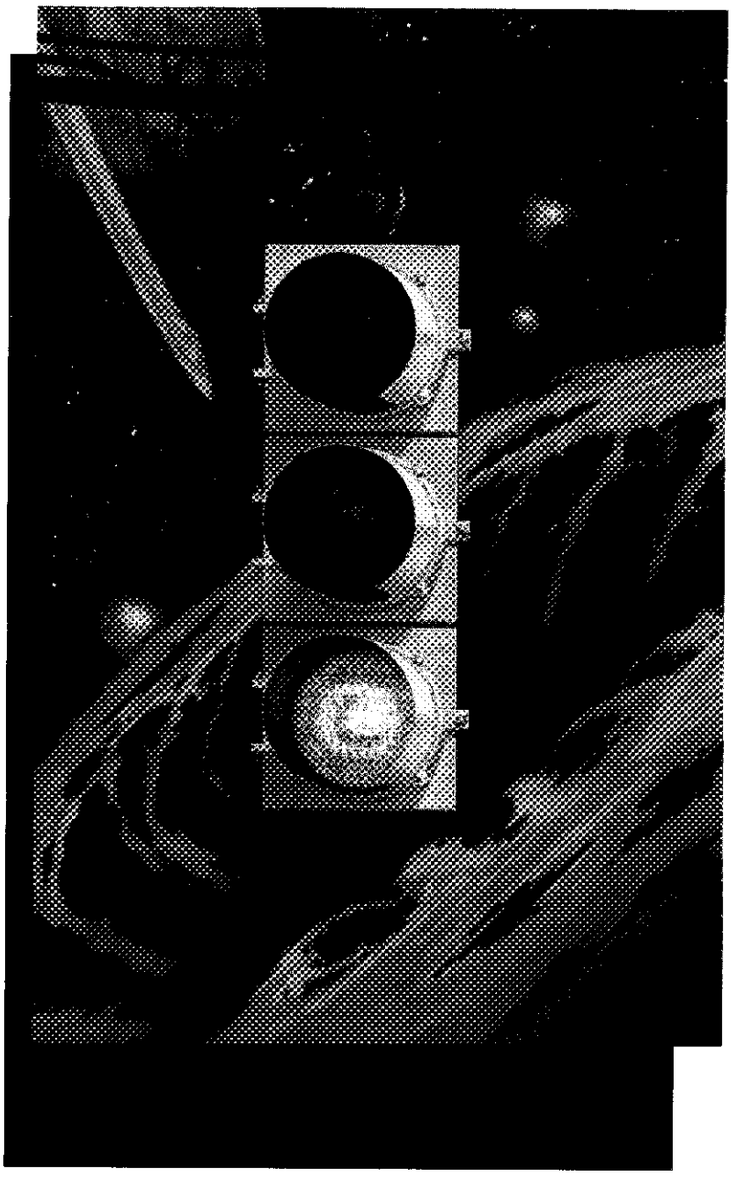
National Youth Science Camp (National Youth Science Foundation)

Since 1963, the National Youth Science Camp has hosted two top graduating high school seniors from each state for four weeks of study. More than 40 nationally known experts in science, technology, and other fields lecture at the camp and /or provide intensive hands-on directed studies workshops on diverse research topics.

When: June-July (four weeks)
Where: Vary by state
Who: High school graduating seniors who have excelled in science, math and technology. (Two students selected from each state.)
Cost: No cost. All expenses paid by the program.
Aid: N/A
Deadline: Varies from state to state (Generally between February and April)
Contact: Allison Greenberg
Associate Director of Program and Alumni Relations
National Youth Science Camp
P.O. Box 3387
Barton, WV 25333
Phone: (304) 342-3342
Web site: www.sciencecamp.org

National Eng

A Week of Engineering Celebration



In 1951, the National Society of Professional Engineers (NSPE) created National Engineers Week, or e-week, in honor of George Washington. Not only was he our nation's first president, he was also a military engineer and land surveyor. In honor of his interest in engineering, NSPE celebrates e-week every year around the time of President Washington's birthday to make the public aware of how engineering affects our lives, as well as foster an appreciation for the profession. In honor of National Engineers Week, local communities create their own programs or follow programs designed by NSPE. This year, it is chaired by the American Society of Civil Engineers and DuPont.

There are also national campaigns cosponsored by NSPE along with government organizations, corporations or professional organizations, such as "Introduce a Girl to Engineering Day."

When one thinks of engineering, lots of math and physics come to mind. But what else is there? And how does engineering apply to our everyday lives? Events that take place during this week are meant to answer these questions. There are other programs designed specifically to spark student's interest in engineering and expose them to the everyday aspects of the field. The next e-week takes place Feb. 17-23, 2002. On these days communities all around the country coordinate programs to fulfill the mission – creating a greater awareness of engineering. Engineers, professional organizations and teachers create and participate in activities to get elementary, middle school, high schooi, and college students, as well as the rest of the community, excited about engineering.

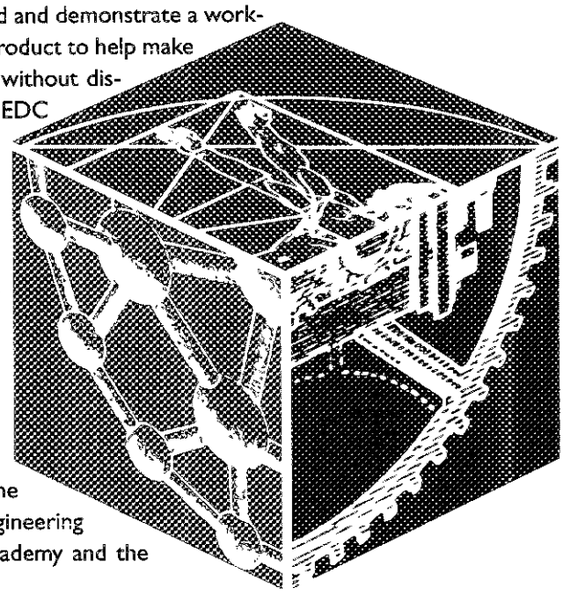
Engineers can join with their local professional organizations or individually participate in e-week by speaking at their local schools as part of the Discover "E program, helping local Boy and Girl scouts with their engineering badges, or even sponsoring an

by Ericka N. Foster

ineers Week

"Engineering Goes Public" at the local mall. As part of e-week, the Richmond Joint Engineers Council in Richmond, Va., visited area schools for career days, printed a 20-page newspaper supplement informing the community of local engineering societies, colleges, and Council activities, sponsored contests for pre-college students and held an awards banquet.

Teachers play a major part in making their students aware of careers in engineering by creating hands-on lesson plans. They can also invite engineers into their classrooms to talk to students. Teachers are an integral part of the Future City Competition, serving as sponsors in the contests. The Future City Competition exposes seventh and eighth graders to all aspects of engineering by building a city and presenting that city in front of judges in Washington, DC. High school teachers can sponsor teams in the National Engineering Design Challenge (NEDC). In this competition, students must design, build and demonstrate a working model of a new product. This year's assignment is to design a product to help make life easier for people with disabilities, that also appeals to those without disabilities. Similar to the Future City Competition, finals for the NEDC are also held in Washington, DC, Feb. 20-21.



The National Society for Professional Engineers has many co-sponsors for National Engineers Week. A wide variety of corporations, government agencies and professional organizations also take part in the week-long event. Participants include the American Institute of Chemical Engineers, the National Society of Black Engineers, the National Aeronautics and Space Administration, General Electric and Eastman Kodak. Together, these organizations sponsor several programs on a national level. NSPE co-sponsors "A Sightseer's Guide to Engineering," and a "Discover Engineering" telecast. There is also an "Introduce a Girl to Engineering Day"(which culminates on February 21) and the "Meet the Engineers Forum." The "West Point Bicentennial Engineering Design Contest" is sponsored by the United States Military Academy and the American Society of Civil Engineers.

The Sightseer's Guide to Engineering is a "Web-based travel guide" to engineering hot spots across the country. The guide includes engineering activities from all disciplines in an entertaining, illustrated display that will show the public the pervasiveness of engineering. The Discover Engineering telecast is a live telecast for junior and senior high school students to learn more about engineering careers. "Introduce a Girl to Engineering Day" is a program created in 1998 as part of a diversity initiative. Women, (in addition to minorities) are sorely underrepresented in the engineering field, this program is designed to make girls more aware of the engineering field and to make it fun. As part of "Introduce a Girl to Engineering Day," IBM has put together a cooperative forum to increase the number of girls reached through National Engineers Week programs, target and encourage women engineers to serve as mentors, to bring to public attention the need for more opportunities for women in the field and to unite engineering organizations in a women-oriented campaign. The Meet the Engineers Forum is a profile of 50 engineers, including Ray Dolby, inventor of Dolby Sound and Celestine Baine, author of "The Fantastical Engineer: A Thrillseeker's Guide to Careers in Theme Park Engineering."

Engineering requires a multitude of skills, including teamwork, communication and problem solving skills. Furthermore, it makes the world a better place, creating roads and bridges, automobiles and software, buildings and cough medicine. But these aspects are often glossed over in the classroom, where students are offered a vast array of career choices. Sponsoring events for Engineering Week makes the world aware of how those engineers affect our lives and shows students how they can change the world.

Future City Competition

Create the City of Tomorrow

by Ericka N. Foster

Have you ever sat in a traffic jam with your parents and thought, "If they had just put a light here, things would move so much better?" Have you looked around and thought of ways that you could make your city and neighborhood better? Students who participate in this year's Future City Competition™ get the opportunity to answer those questions. The competition, which takes place February 17-23 as part of the National Engineers Week, hosts seventh- and eighth-graders from all over the country. Awards given for creating the best city of the future include a trip to Space Camp, and scholarships. Furthermore, the competition's mission focuses on four goals: fostering engineering skills, communication and problem-solving; providing interaction among students, teachers and engineer mentors; informing the community about the various disciplines within the engineering profession; and inspiring students to explore futuristic concepts and careers in engineering. Above all, students find it fun since it allows them to use their imaginations.

The teams consist of three students, a teacher and an engineer advisor. The teacher is the sponsor and prepares the students for the contest throughout the year. Teachers, along with the engineer advisor, also provide guidance for the students in building the city. Future City gives the students a hands-on introduction to different types of engineering, from civil to electrical, chemical to mechanical.

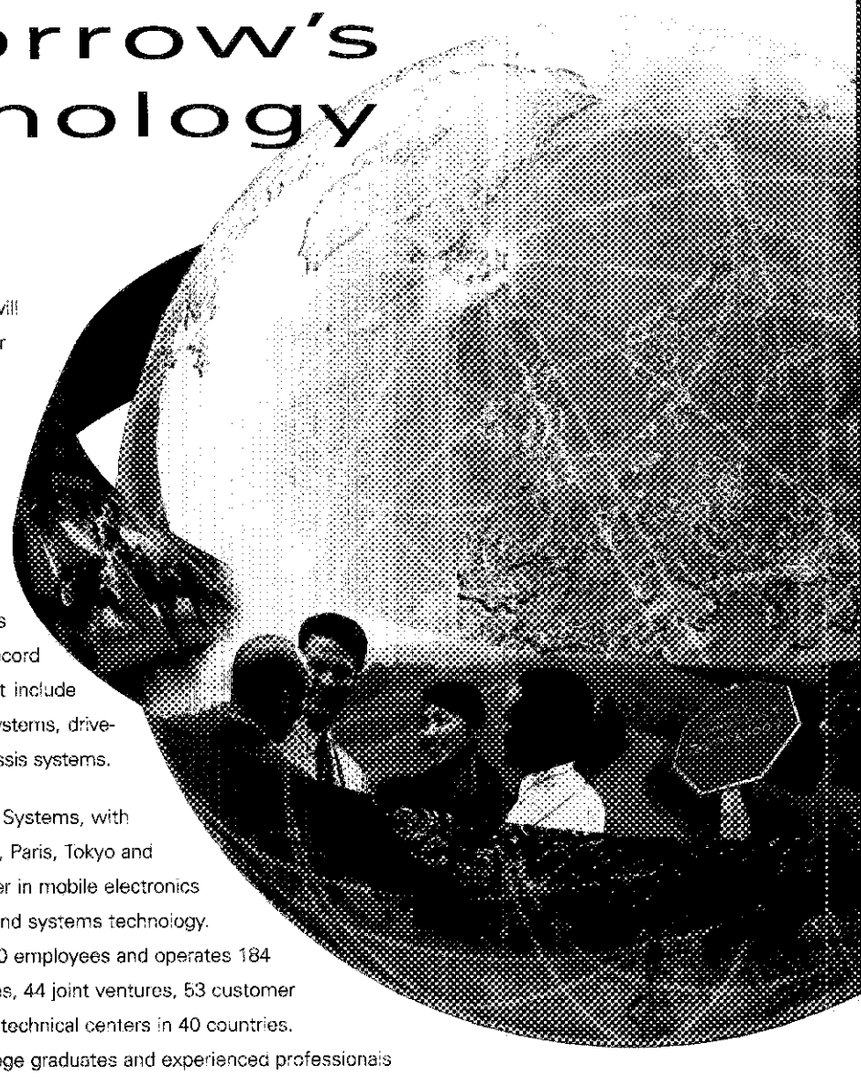
The competition teaches writing, public speaking, teamwork, time management, problem-solving and new computer skills and gives students engineering experience: design, building, essay and presentation. Participants are guided by a timeline and rules for each part of the competition. The students design a logical model of the city, with the help of their teacher and engineer advisor, using SimCity 3000™ competition software.

Students are evaluated by a panel of judges using a scoresheet; the team with the highest score wins. Students compete in their regions, and regional winners get a trip to Washington, D.C., to participate in the national competition. First prize this year is a trip to Space Camp. Second prize is a $2,000 scholarship to the winning school's technology program, sponsored by the Society of Manufacturing Engineers. And third prize is a $1,000 scholarship for the winning school's technology curriculum awarded by the National Society of Professional Engineers.

The Future City Competition gives students a well-rounded view of engineering while building skills that they can apply to all aspects of their lives. "For some of these students, this is the first time they've ever worked as a team – cooperate on a design, share research duties, brainstorm, reach consensus and make a presentation – and that's a critical lesson to learn, because it's the essence of engineering," Carol D. Rieg, National Director, Future City Competition says "Once they begin to think like engineers and see how they work, they begin to realize that engineering touches almost every part of their lives."

For more information, visit: info@futurecity.org

Driving Tomorrow's Technology



The next generation of drivers will require vehicles that provide safer travel with superior accident protection, on-board communications systems, passenger entertainment and mobile productivity, as well as greater environmental efficiency. As a solutions-focused automotive supplier, Delphi Automotive Systems is committed to continuing its record of technology breakthroughs that include advanced energy management systems, drive-by-wire systems and modular chassis systems.

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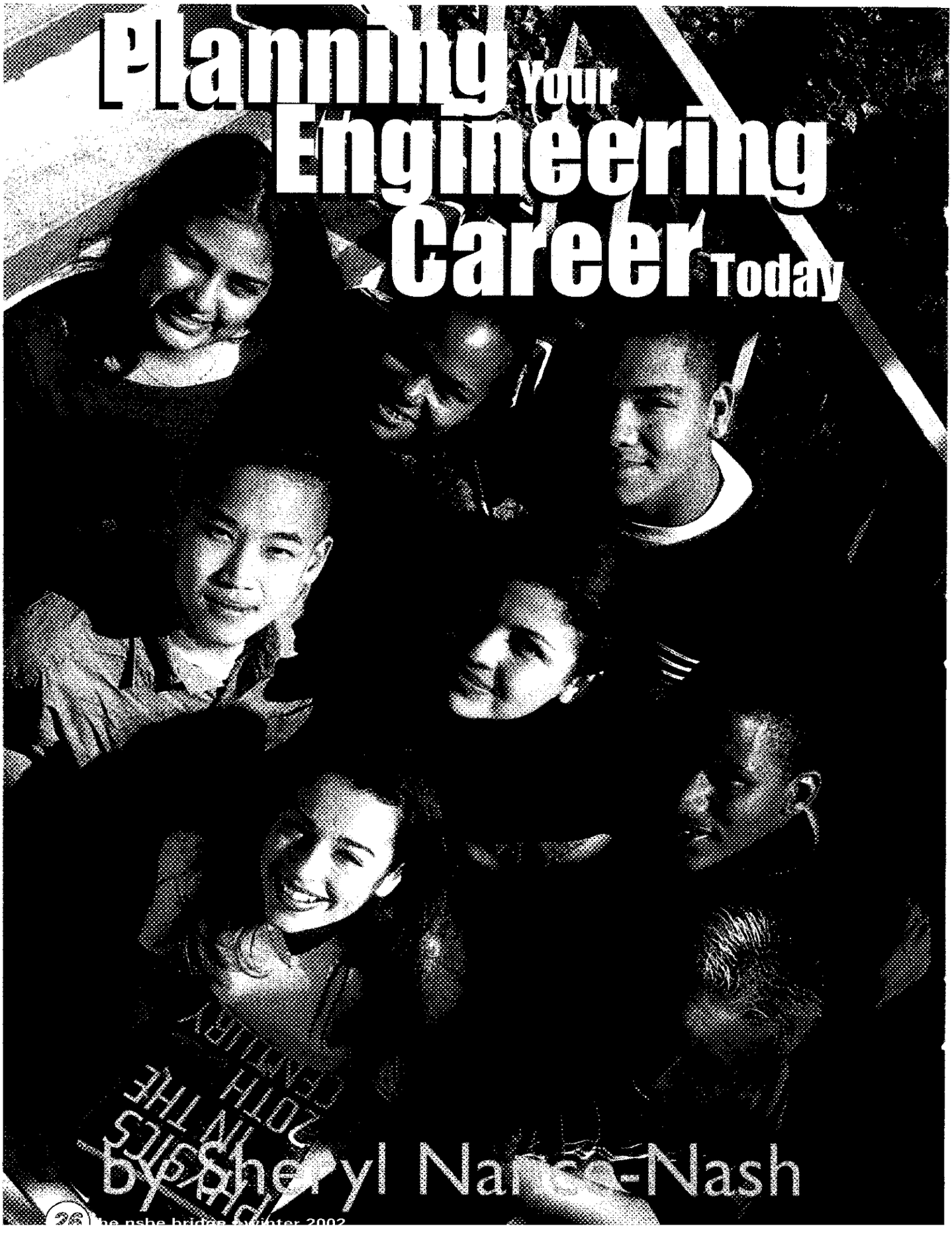


by Cheryl Nance-Nash

"If you can understand math and science, you're way ahead of the game, no matter what career you choose." – Rocio Cardenas.

Bringing Out the Engineer in You

Cardenas, a 17-year-old senior at Dunbar High School in Fort Worth, Texas, spent the last three summers in (MS2), a competitive math and science program for minority students at Phillips Academy in Andover, Mass. All students take nearly 10 hours a week of math, including algebra, precalculus, trigonometry, probability, statistics and calculus, and 10 hours of science, including biology, classical genetics, evolution, chemistry and physics. First- and second-year students also get four hours a week of English and third-year students take a college counseling course that includes visiting top colleges. Tuition, textbooks and course materials are free. Students receive full room and board at no cost.

"What a learning experience. It was rigorous. We had a full schedule Monday through Friday and part of Saturday. I spent at least two to three hours a night doing homework. It was intense," says Cardenas, who graduated from the program this past summer.

But she learned more than just academics. "Living in the dorms, being away from home, you learned about yourself, who you are," she adds. Almost immediately students became like family, and being around others who were highly motivated and serious was inspirational, says Cardenas, who is looking at several colleges and weighing various career paths. "Whatever I study, I will continue to focus in part on math and science."

She says she feels ready for anything. Preparation is key. It's never too soon to begin exploring career options. There's no need to wait until you get to college. Whether you're in middle or high school, there are a plethora of programs, many internships, and summer camps, pre-engineering summer camps and high schools with heavy emphasis on science and math, to give you a head start.

"That leg up is needed, because many students are coming out of high school without the math and science background necessary to go into fields like engineering," says James H. Johnson, dean of the school of engineering at Howard University in Washington, D.C.

Even in cases where students are interested in science and math early on, their schools may not offer the quality of education that is required. There's been much debate about the math and science gap, particularly among minority students. That void is part of the reason why minorities continue to be underrepresented in the engineering and science professions.

An array of programs and opportunities exist to help bridge the divide. Here's a roundup of some of what's out there.

nasa sharp program

The NASA SHARP Plus (Summer High School Apprenticeship Research Program) an eight-week, paid, summer apprenticeship program offers real-world research opportunities for students who work with professional research scientists and engineers in academia and industry. In addition, with guidance from their mentors, students create and present their own research projects. Apprentices also participate in a variety of activities organized by the host universities such as sessions on math, science and engineering careers, test taking, computer skills workshops or an overview of college admissions and financial aid procedures.

"I worked on solar panels and spent time doing tests in the lab. We all had to do PowerPoint presentations and submit a paper to NASA about our projects. I got the lab experience I was looking for. I know it will make a

difference when I apply to college," says Anita Batra, 17, a senior at The Meadows High School in Las Vegas who participated in the SHARP program at California State University at Los Angeles this past summer.

Yonatan Tekleab, a 17-year-old senior at the Oklahoma School of Science and Mathematics in Oklahoma City, also attended the program this past summer. "I worked at TRW organizing databases for electrical engineers, and for my presentation I did research on satellite signals. I'm interested in aerospace engineering, but after learning all that I did about electrical engineering, I may do a double major next year," says Tekleab, who has applied to schools like the Massachusetts Institute of Technology and the Georgia Institute of Technology.

"Not only did I learn a lot from my mentor and others I worked with at TRW, I had a lot more fun than I ever expected. It was great to be in the company of top-notch students," he adds.

Indeed it is the mentors and instructors who are key to any program's success. Since 1994, Kenneth Preston, a product manager in the orbiter vehicle engineering department at Boeing in Los Angeles, has worked with the NASA program at Cal State Los Angeles. He says of his role, "I introduce them to the corporate world, everything from how to dress and speak, to what kind of career paths they can explore, and helping them to create networks. I help them with their projects and make them a part of my day, including bringing them with me to meetings," says Preston.

"It's important that those of us in the field give back. I received in abundance, I want to do the same, and I challenge my mentees to do the same for someone else."

"I worked on solar panels and spent time doing tests in the lab."

NASA Sharp Program — Anita Barta

What does he try to convey most to students? "Science and math are the basis of everything you do: Every toy has a shape, that's geometry; the human body is biology, chemistry, that's science. We have to explain math and science in a way that can be understood," he adds.

goddard space flight center

NASA sponsors other programs through the Goddard Space Flight Center Education Office in Greenbelt, Md., which requires academic pre-screening by the student's school and a recommendation from a counselor or teacher. Here's a look at some of them. There is a mentoring program where students work with scientists/engineers during the school day, three or four days a week for a minimum of three weeks. The Structured Intern Program is a three-week, unpaid internship involving computer-aided design for building a computer model of a spacecraft component. After verification, the component is added to libraries for use in conceptual spacecraft design. The National Science Club Scholars offers students "real life" work experience in space sciences or engineering for future career planning. Through the Job Shadow program, students accompany and observe scientists and engineers as they work for a pre-arranged period of time, usually 1 to 3 hours. Using a series of Web sites that assist them in acquiring information about the various enterprises available through GSFC, a link is established to school-based curricula with reinforcement of science, math and technology programs in real-time. One of the more recent additions is the Academy of Finance internship, a six-week paid summer internship where students gain work experience in an industry-related business position.

secme

The Southeastern Consortium for Minorities in Engineering, based at the Georgia Institute of Technology, is another program working to prepare historically underrepresented K-12 students to enter and finish college studies in science, math, engineering and technology.

SECME sponsors national competitions such as a mousetrap car design, where middle/junior or high school students make a vehicle that is powered by the spring of a mousetrap. Teams must also develop technical papers and drawings for their car. Students also compete with essays, posters and banners.

SECME primarily focuses on teachers, showing them innovative ways to teach technical subjects through its annual two-week summer institute. They leave with notebooks full of classroom-ready material. SECME doesn't stop there. It also sends staff into schools to develop teachers to help support their programs and club activities.

SECME has begun to reach out to parents. "We want to equip parents to be more of a part of their children's education. If their child builds a mousetrap car or bring home challenging work, we don't want the subject matter to be foreign to parents. We are trying to empower parents to be coaches, full partners in their children's achievements," says Ed Aebischer, SECME's program coordinator.

Francis (Mac) Haas, who went on to Drexel University in Philadelphia, talks about the difference SECME made in his life. "Probably my most interesting SECME experience was 'Texas Fly High,' linking high school students with NASA engineers. We flew microcapsules containing a cancer drug and did preliminary tests in zero gravity. NASA later put the microcapsules on John Glenn's last flight," says Haas.

"The next year, we flew paper airplanes in zero gravity to track flight patterns. A published paper was real research and also fun. We toured Johnson Space Center (in Houston) and its robotics area," he adds.

His SECME projects helped him see engineering not as following a formula, but as problem-solving that can benefit people and their environment.

mite^{2}s

The Minority Introduction to Engineering, Entrepreneurship and Science (MITE^{2}S) program is available at various college campuses around the country. Here's a look at the program at the Massachusetts Institute of Technology. MITE^{2}S is a six-week residential summer program for high school students from around the United States. It is 100 percent scholarship-based. Students only pay for their transportation to and from MIT.

Courses include calculus, physics, biochemistry/chemistry, writing, entrepreneurship and engineering design.

"The exposure helps clarify student's visions about their careers. That clarity means they can better match their interests with a career, then they're likely to be more determined and persistent," explains Karl Reid, executive director of the program.

In addition to academics, students meet faculty and hear guest speakers from industry, including people of color who talk about their experiences and their research.

> **"Probably my most interesting SECME experience was 'Texas Fly High,' linking high school students with NASA engineers."**
>
> **— Francis (MAC) Haas**
> **SECME participant**

In a quick scroll through the MITE^{2}S Web site, (http://web.mit.edu/mites/www), it's easy to find student testimonies about the program's merit. Says Akira Robinson, a member of the MITE^{2}S class of 2000 who hopes to study biomedical engineering or biochemistry: "MITES helped me open doors that I never knew existed. Because I was immersed in an environment with people that I did not know, I discovered a new aspect of my personality. Through the merciless problem sets and dire quizzes, I obtained knowledge and learned many valuable lessons. As a MITES student, I found an experience that was not only challenging for the person that I am now, but also an extraordinary way to hone the skills that I believe are necessary to succeed in the medical field."

The track record of MITE^{2}S students is impressive. "Eighty percent of the students go into engineering. Typically, around 50 percent of the students come back as freshmen here. Many others go on to the likes of Harvard and Princeton. Given the success, a weekend version of the MITE^{2}S program was recently started for local students. The success stories are many. They go on to become scientists, physicians, teachers, engineers and other professionals."

mesa

MESA (Mathematics, Engineering, Science Achievement) is available to students in Arizona, California, Colorado, Maryland, New Mexico, Oregon, Utah and Washington. Here's a look at the MESA program in Portland, Ore., run by the College of Engineering and Applied Science at Portland State University. Some of the opportunities for sixth- through twelfth-graders include: weekly activity group meetings with the teacher/advisor; field and technical site trips; team activities; independent study; tutoring and study groups; competitions; career advice and education; summer enrichment activities; mentoring; internships; college search advice; and college visits.

The program gets results. MESA continues to produce high school graduates, and nearly 100 percent have enrolled in postsecondary institutions. MESA high school graduates have been awarded more than $233,000 in college scholarships since 1989.

inroads

The mission of INROADS is to develop and place talented minority youth in business and industry and prepare them for corporate and community leadership. While much of the emphasis is on college students, there is a pre-college component. The PCC program offers intensive college preparation for minority high school students. There is supplemental academic instruction in math and English as well as ACT preparation in some cases.

But INROADS is more than academics. The leadership program incorporates career guidance and exposure. The sessions take place at host colleges and universities around the country on Saturdays during the school year and weekdays for two six-week sessions during the summer. The program's structure depends upon the needs and opportunities in each community. Check with your school counselor to find out if there is an INROADS program in your city or town.

Here is a list of Web sites that you'll find useful.

1. (www.petersons.com) – search for summer opportunities: petersons.com/summerop/ and you can select programs by activities offered, you can choose from 150 academic subjects, including engineering, biotechnology, computer science, math, chemistry and others, for special summer camps in those areas.

2. The Council of Independent Colleges is a good spot to check out summer programs for minority pre-college students: (www.cic.edu/newspubs/pubs/oppdirec/oppdirec.shtml).

3. Science Camps for Kids at WebFanatix: (www.webfanatix.com/science_camps_for_kids_at_webfan.htm).

4. For a robust introduction to the field – you'll find out how to prepare for engineering school, find out what engineers do and pick up practical pointers for applying to college and evaluating financial aid offers, among other good stuff, check out the NACME Online Guide to Engineering, (www.guidemenacme.org).

5. Also from NACME, log on to (www.mathispower.org), for math challenges, arcade games, a resource room with information about summer, after-school and Saturday programs as well as tips for your parents.

6. (www.pre-engineering.com) – you'll find information on software for students interested in engineering like Bridge Builder, in which students are the engineers on a project to design a bridge to support a 40-ton truck. You'll create real engineering designs, then watch as your creation is put to the test. You can analyze the results to determine how to make your structures stronger and more efficient.

other resources

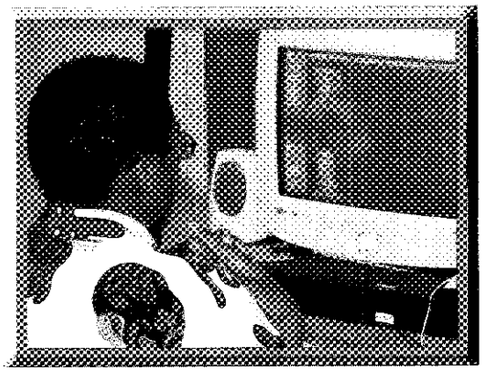
In addition to the many programs, there are all sorts of opportunities that can feed your interest in science, math and technology.

it's up to you

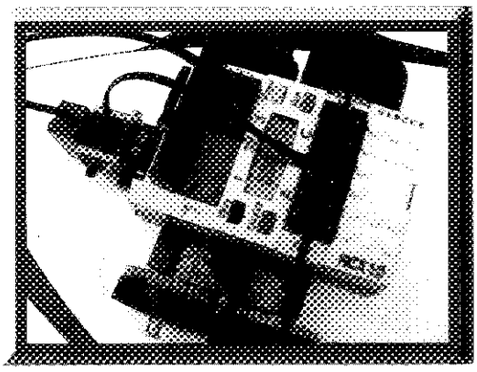
There are lots of opportunities, many are of little or no cost to you. It's up to you to seek them out and take advantage of them. Peter Watt, an instructor with the (MS2) program at Phillips Academy said, "Students find opportunities that may not exist at their schools, because they may not even have labs or have poorly equipped labs. Unlike their schools, classes are small, and being around a bunch of bright students from all over the place is exciting. It's not competitive, because students' grades don't count when they go back home. Students learn a lot, work hard, but have fun, too."

FIRST Lego League

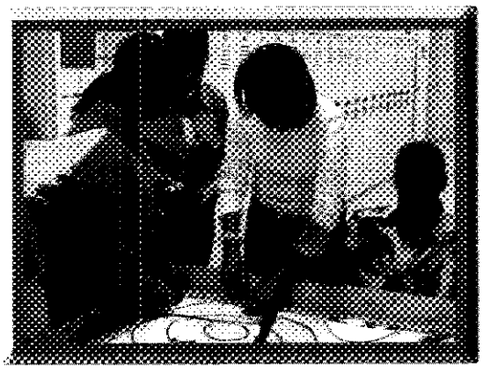
Featuring Artic Impact



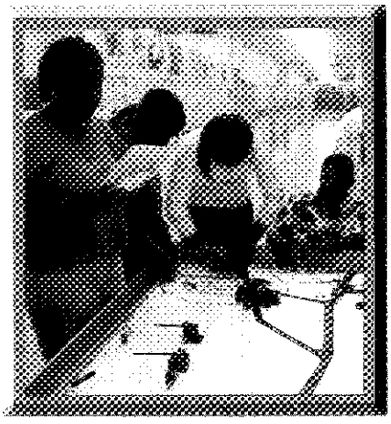
Adam Perry writing a program for the robot to perform



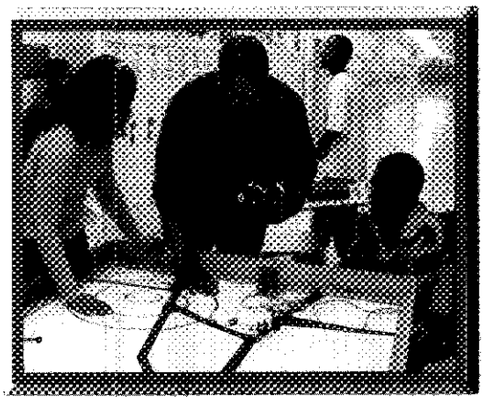
Robot designed by the students



Team putting together a plan to accomplish the new instrument mission



Students testing robot on the playing field

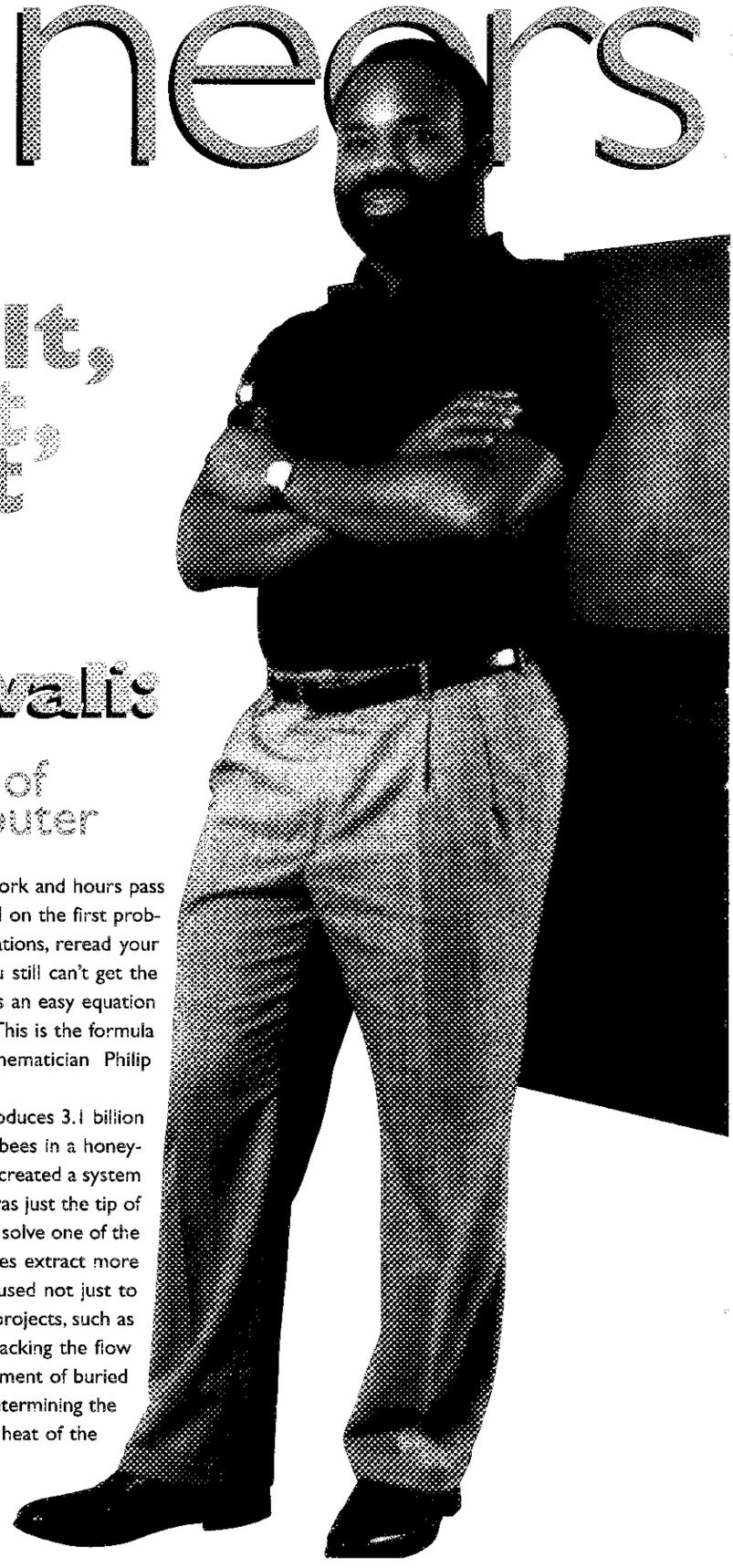


Team members prepare for competition

Adam Perry works with the transmitter to the robot

Engineers

Conceive It, Believe It, Achieve It



Philip Emeagwali:

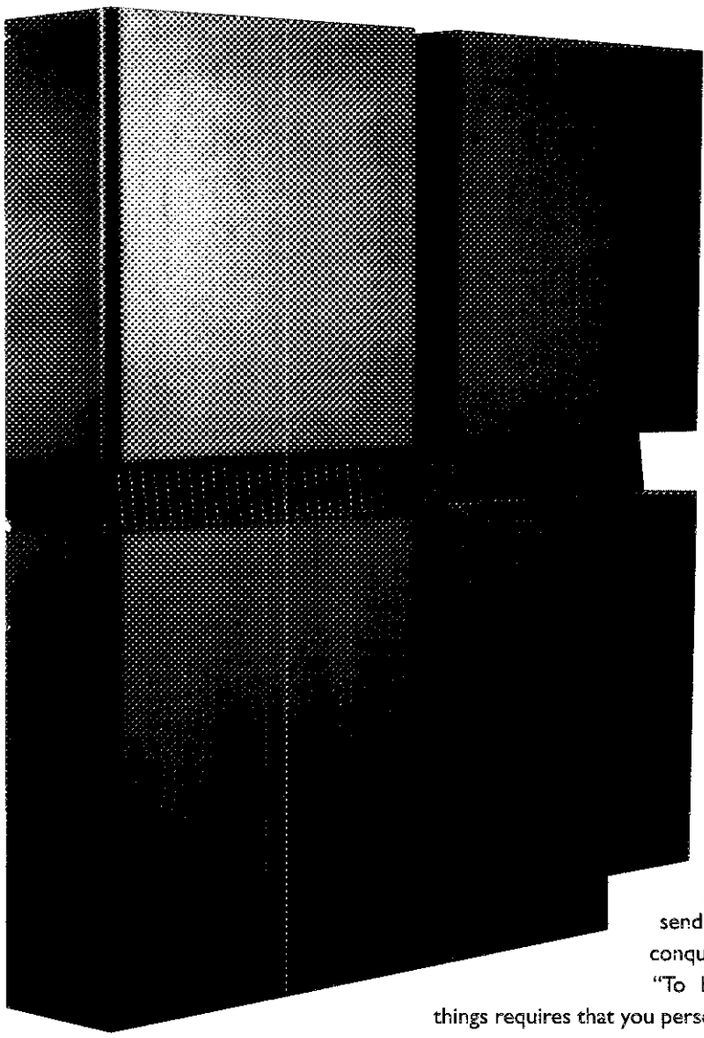
The Inventor of the Super Computer

Have you ever started on your math homework and hours pass and you're still working on it? In fact, you are still on the first problem. In that time, you've tried four different equations, reread your notes, even called one of your classmates. Yet you still can't get the right answer in the back of the book. Well, here is an easy equation for you: Conceive + Believe +Achieve = Success. This is the formula for success that has aided the famous mathematician Philip Emeagwali.

Emeagwali invented a supercomputer that produces 3.1 billion calculations per second based on the concept of bees in a honeycomb. With the philosophy that more is better, he created a system that used 65,000 computer processors. But that was just the tip of the iceberg. That same supercomputer helped him solve one of the hardest questions in the world: how can companies extract more oil from rocks. Now his supercomputer is being used not just to find oil but for several other major international projects, such as improving the accuracy of weather predictions, tracking the flow of blood in the human heart, calculating the movement of buried nuclear waste, tracking the spread of AIDS, and determining the long-term effects of gases in the air and how the heat of the sun is burning up the Earth.

"When I was in elementary school, my father made me solve one hundred mathematics

in Action



problem each day. That daily practice laid a solid mathematical foundation that helped me become a better mathematician." That foundation remained in tact even after Philip had to drop out of school after the eighth grade, when his parents could no longer afford tuition for school. He taught himself from 6 a.m. until midnight — even as his family moved from refugee camp to refugee camp in Nigeria during a civil war. He got the equivalent of an General Equivalency Diploma from the University of London and went on to get several degrees, including a Ph.D. in Scientific Computing from the University of Michigan; two Master's degrees from the George Washington University, one in Ocean and Marine Engineering and the other in Civil and Environmental Engineering. He has another Master's degree in Applied Mathematics from the University of Maryland.

When you sit in a math class or read a math textbook, the numbers can become overwhelming. It is easy to get so focused (or frustrated) at the numbers and the formulas that the purpose of these equations gets lost. These equations are the stepping stone to making the world more efficient, more cost effective, more simple. When asked why he enjoys doing what he does, Emeagwali answered, "Computers, the Internet and petroleum touch the life of many people and help make the world a better place. Without petroleum, all cars, trains, aircrafts will be grounded. Without computers and the Internet, we cannot send e-mail to our friends." Who would have thought that conquering that math problem could help him change the world?

"To be successful in most things requires that you persevere, stay focused, take some measured and calculated risks," he said.

Emeagwali insists that he wasn't born a genius. It was drive and ambition coupled with hard work that allowed him to achieve these great accomplishments.

With a laundry list of accomplishments including the Bell Award (considered the Nobel Prize of computing) and an even longer list of goals, it is surprising that Emeagwali does anything other than math problems. However, he plays tennis and enjoys running. He also enjoys spending time with his wife – another award winning scientist – and his eight-year old son. He is inspired by boxers Dick Tiger and Smokin' Joe Frazier, as well as Yoruba art and history. He also spends time speaking at schools on math, computers, and racism in the field.

Emeagwali is not just an inspiration to scientists and mathematicians. Everyone can learn something from his example. Whatever your circumstance, you can accomplish your dreams through hard work and perserverance.

STEPS:

Preparing Girls for Careers in Engineering

Imagine having a week-long slumber party, and instead of the few friends that you usually invite, your guest list includes more than 40 girls giggling, biking, eating pizza and building radio-controlled airplanes. The Science, Technology and Engineering Preview Summer Camp for Girls (STEPS) gives girls a chance to do all of those things while learning about engineering in a fun atmosphere.

by Ericka N. Foster

Participants spend the week on campus engaging in hands-on technology projects and recreational activities.

According to statistics from the Engineering Workforce Commission, women made up 20 percent of the full-time undergraduates studying engineering in 2000. Why is it that so few women and minorities choose engineering as a career option? A 1998 Harris poll revealed that about 75 percent of women were not well informed about the work that engineers do and how they contributed to society. To help fill that knowledge gap, the Society of Manufacturing Engineers (SME) created STEPS. The program is designed to give girls a hands-on approach to learning the applications of engineering.

Based in Dearborn, Mich., SME is a professional organization for manufacturing engineers. Founded in 1932, the organization influences more than 500,000 manufacturing personnel in 70 countries. The Society offers member programs and is a valuable resource for professional development improving the professional lives and well being of manufacturing engineers. In addition to being a source for technical information, SME encourages lifelong learning. SME is also dedicated to inspiring children in grades K-12 to pursue the field of engineering.

As part of their commitment to education, SME created an educational foundation to provide support for the advancement of manufacturing education. The foundation has made cash grants of more than $15.4 million to colleges and universities in the United States. It also creates programs to spark students' interest by creating partnerships with other groups. Programs include FIRST (For Inspiration and Recognition of Science and Technology), BEST (Boosting Engineering, Science and Technology) and the National Engineers Week Future City Competition. It has created the STEPS program.

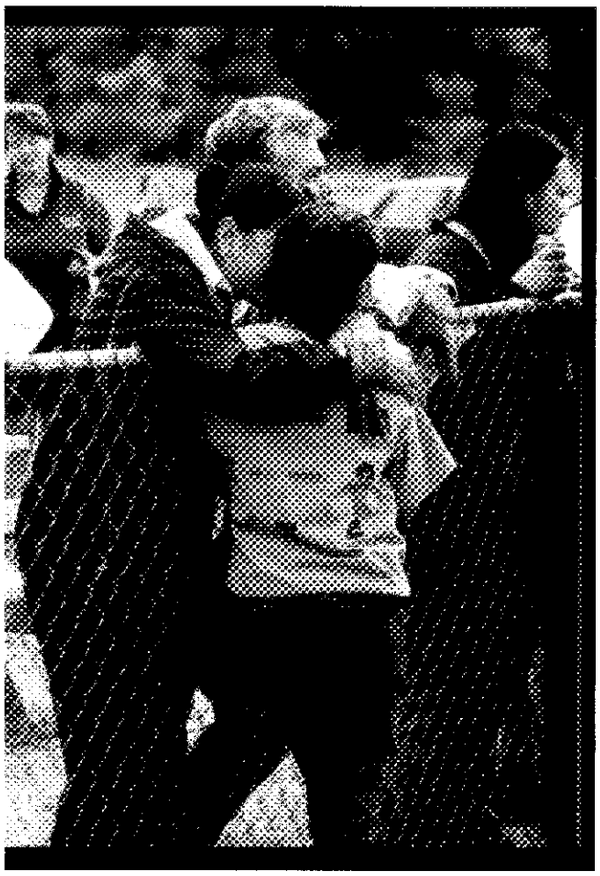
The STEPS summer camp is funded by the SME Educational Foundation in collaboration with grants from other foundations. Previous contributors include Ford Motor Co. and the Bush Foundation. In cooperation with area universities (like the University of Wisconsin-Stout), the SME Educational Foundation hosts 160 girls in groups of 40. The program started in Wisconsin in 1997 and has since expanded to Minnesota. STEPS will have an inaugural program in Michigan next year. In Minnesota, SME recruits attendees by sending brochures to every public and private school in the state. The girls sign up individually and are chosen at random, since there are usually more applicants than spots. In Michigan, the organization will be doing more targeted recruiting, working through a number of high schools. The program is open to girls entering seventh grade, with 30 percent of the spots held for minority students.

Participants spend the week on campus engaging in hands-on technology projects and recreational activities. At the same time, they also learn team-building, increase self-esteem and work on their communication skills. The girls have the opportunity to attend this tuition-free program and participate in projects like designing; manufacturing and flying a radio-controlled airplane. To complete this task, they must also learn how to operate a hot wire cutter, an injection molder, a jig, a router and other machinery. They also have other projects in which they

design a shrink-wrapped package to hold a notepad and pencil; make their own aluminum cast in the shape of a mushroom; manufacture a sailboat; fabricate a wooden game board in the manufacturing lab; and bind and trim their own notepad with the STEPS logo on each page.

"STEPS exposes young women to the career opportunities in engineering early enough to influence their choices of math, science and technical courses in middle and high school. They are exposed to great role models, and experience a great sense of accomplishment when the airplane or rocket *they built* flies into the air." says Lynn Borg, Development Director-Youth programs. This excitement and sense of accomplishment encourages these girls and makes them believe that they are capable of becoming engineers, even though it is a male-dominated profession.

After participating in this summer camp and learning about the "world of engineering," girls can choose classes in high school to make them most prepared for undergraduate studies in math and science. In addition to the projects, the girls have an opportunity to meet other girls and women interested and excelling in technology. These women serve as mentors to the younger girls.



The presence of a mentor is important in a field with so few women. STEPS participants are led by a camp director, assistants, faculty and staff, who are there to give the girls a firsthand view of engineering. The camp counselors are women who are undergraduate engineering students. Each campus also brings in women from industry to serve as instructors, lab assistants and speakers. The girls are grateful for the experience, and the mentors are fulfilled. For Wendy Walker, any doubts that she had about choosing manufacturing engineering as a career choice went away when she became a lab assistant for a STEPS session. STEPS is more than just a weeklong science fair, it is an opportunity for the girls to bond. It is an opportunity for girls to learn about themselves, and most importantly, feel good about themselves. "The impact of the STEPS program goes well beyond the six days spent at camp. Not only do the girls have an opportunity to attend both STEPS and Advanced STEPS, many also return to serve as camp counselors and mentors," says Borg.

Once they enter 10th grade, girls are eligible for the Advanced STEPS program. Similar to the program for the seventh-graders, girls spend a week in a dorm bonding and working on science projects. The difference simply being more advanced projects. Advanced STEPS activities include designing, manufacturing, and launching a rocket payload. Campers will also be involved in the production of a camp newsletter as well as other science and engineering activities such as computer-aided design and robotics. For an organization so involved in impacting the career choices of young people, it is not hard to believe that SME has no intention of slowing down when it comes to connecting girls to engineering. The organization plans to expand the program to 10 more states over the next four years. They also intend to create a National Youth Council. The Council will be comprised of members representing all engineering disciplines, and they will focus on increasing collaboration among engineering societies, academia and industry, as well as recognizing outstanding outreach programs. Hopefully, they will be able to bridge the gap that now exists between promising engineering talent and the actual engineering workforce.

For more information about the STEPS program, contact: Lynn Borg-Youth Programs
SME Education Foundation
One SME Drive, PO Box 930
Dearborn, MI 48121
313-271-1500 ext. 1713
borglyn@sme.org

Convention Preview

Are you ready to have a good time while learning? Do you want to meet engineers and college students preparing for engineering careers? Would you like to come home with prizes and awards and new friends? If so, the National Society of Black Engineers (NSBE) National Convention is the place to be.

Held this year in sunny Florida, this year's theme is "Integrating Technology and Tradition." The convention will focus on efforts to combine experience, history and cutting edge trends in technology.

Pre-college students will enjoy competitions, speakers, workshops, demonstrations, tours, and entertainment designed for their enjoyment. Students will be able to talk with working engineers at Disney about how they design roller coasters, and they will get first-hand experience with a life-size robot.

Your NSBE Jr. Chapter will want to be there to show your academic ability and team spirit. Are you ready for the challenge?

competitions

A broad range of competitions are planned for students who come prepared to show their academic prowess and are ready to have a good time learning. NSBE Jr. members participate in competitions ranging from Try-Math-A-Lon, a "Jeopardy"-style competition, to model rocketry. Students will also be given a FIRST Competition demonstration of a 6-feet tall robot. FIRST is the sponsor of the national robotics and Lego competitions. Students in grades 7 through 12 will also be able to participate in the 2002 National PCI Science Fair. The categories include biological/life sciences, physical sciences, and engineering. PCI students will also be able to participate in model rocketry basics as well as being able to compete in the Rocketry Competition.

tours

Each year, students tour companies and plants in the convention's host city. This year's tours are scheduled to include Walt Disney World, where students will meet with engineers and discuss how rides are designed and what it takes to become an amusement park engineer.

Tours are also scheduled for other technology companies in the area, where students will be able to ask questions and meet engineering and technology role models.

workshops

Specially planned workshops are designed for students on a broad range of topics including preparing for college and avoiding the pitfalls that students may fall into during their freshman year. Workshop speakers offer advice and practical applications for questions and concerns that students may have in preparing for college and their future engineering careers.

entertainment

Evening activities are planned for students with a live DJ. In addition, students will be able to show off other skills during a scheduled talent show.

college fair

Students who are curious about college options will be able to meet with college recruiters and have their questions answered. Information will be available about numerous engineering programs all over the country.

career fair

The Career Fair is a part of the broader convention. NSBE Jr. students will have an opportunity to network with corporate recruiters from a large cross-section of companies who can offer a glimpse of what it's like to work for a large corporation. Students receive information and product samples, and experience technical demonstrations, including virtual reality tours.

For more information about the NSBE National Convention and the Pre-College Initiative Conference, visit our Web site at www.nsbe.org or call (703) 549-2207 ext. 204.

NSBE

The National Society of Black Engineers (NSBE) offers a number of awards, scholarships and competitions for pre-college students throughout the country. NSBE strives to stimulate student interest in technical fields such as science, mathematics and engineering. By participating, students can show their skills and be recognized during the NSBE National Convention in Orlando, Florida.

Iris Lee Norwood High School Essay Contest

The objective of the essay contest is to encourage high school students to enhance their written communication skills and provide them with a platform for creative expression. The contest winners will be announced at the NSBE National Convention.

Eligibility: High school students in grades 9-12 who are NSBE jr. members.
Judging Criteria: Clarity, grammar, organization, and subject treatment.
Essay Topic: Candidates must submit an essay addressing how they will use their technical degree in "integrating Technology and Tradition" in their lives.
Guidelines: Essays must be typed, having 500 words or less. An entry form must accompany all essays.
Awards: *First Place* $500
Second Place $250
Third Place $100
Deadline: January 11th (each year)

Apply Online: www.nsbe.org (Pre-College Link) or send in your submission to:
Iris Lee Norwood High School
Essay Contest
National Society of Black Engineers
1454 Duke Street
Alexandria, VA 22314
Contact: Pre-College Initiative
Programs Associate
NSBE National Headquarters
(703) 549-2207, ext. 204

Leroy Callender Award

This award is presented to two outstanding high school students who have demonstrated scholastic achievement. Winners will be recognized at the NSBE National Convention.

Eligibility: High school students in grades 9 through 12, who reside in the host region of the NSBE National Convention. Applicants must be NSBE jr. members.
Award: $500
Criteria: One letter of recommendation, including the relationship between the referral source and the student, and how the student has demonstrated scholastic achievement and community involvement.
Deadline: January 11th (each year)
(The following states are in the host region of the 2002 convention: Florida, Kentucky, Georgia, Alabama, Mississippi and Tennessee.)
Contact: Pre-College Initiative
Programs Associate
NSBE National Headquarters
(703) 549-2207, ext. 204

Golden Torch Award Scholarship Program

The Golden Torch Awards (GTA) Scholarship Program is NSBE's most prestigious award for pre-college students. The GTA Scholarship Program honors high school students who exemplify leadership and excellence in academics and community service. Selections will also be based on the student's educational and professional career goals.

Eligibility: Candidates must submit copies of their most recent transcript, with a minimum GPA of 3.0,

scholarships & awards

a typed personal statement about how they will continue the legacy of NSBE and three letters of recommendation.
Awards: $1,000 per year, for four years
Deadline: January 11th (each year)
Contact: Pre-College Initiative
Programs Associate
NSBE National Headquarters
(703) 549-2207, ext. 204

Dwight Willis Oratorical Contest

The Oratorical Contest was designed to provide a platform for high school students to enhance their public speaking skills. Participants will compete at the Spring Regional Conferences, and the six regional winners will compete at the National Convention.

Eligibility: Open to pre-college students in grades 9-12. This year's topic is "Integrating Technology and Tradition" in your life.
Guidelines: Speeches must be 3-5 minutes in length.
Judging Criteria: Clear introduction, relevant topic, good content, professionalism, style and diction.
Awards: *First Place* $500
Second Place $250
Third Place $100
Deadlines: January 11th (each year)
Contact: Pre-College Initiative
Programs Associate
NSBE National Headquarters
(703) 549-2207, ext. 204

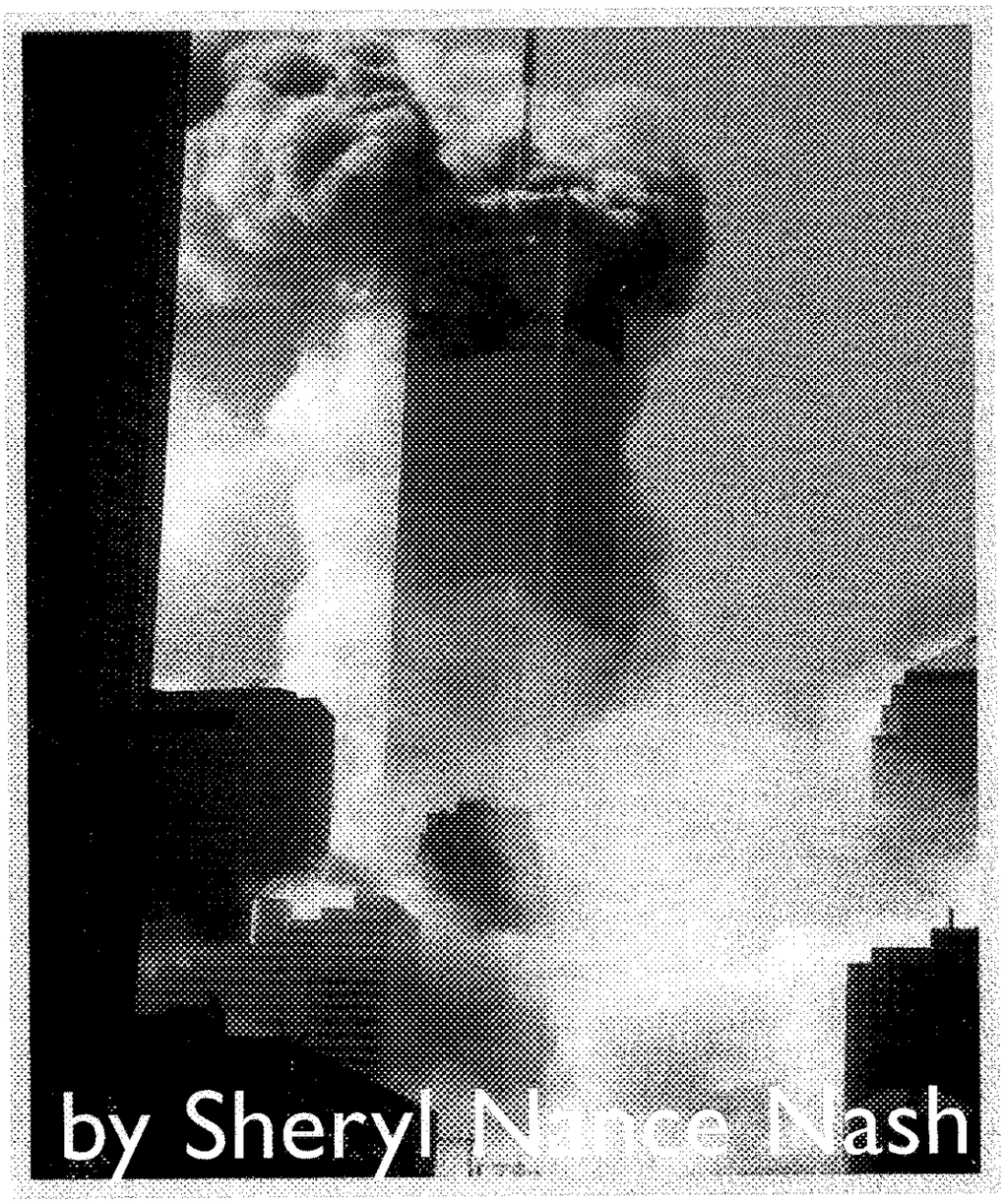
Try-Math-A-Lon

Created and facilitated by the NSBE Alumni Extension (of technical professionals), The Try-Math-A-Lon program seeks to improve the math skills of high school students to prepare for the PSAT, SAT and ACT college admissions exams.

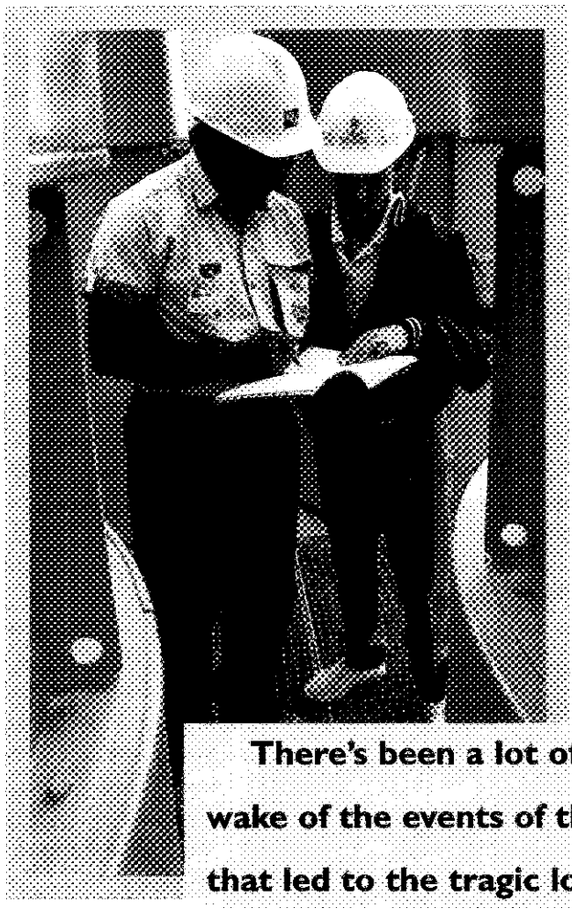
Eligibility: Teams of high school students in the 11th and 12th grades compete. Teams must be comprised of four students who link with local NSBE collegiate and/or alumni chapters. An eligible team cannot consist of four seniors.
Awards: Students receive trophies and monetary awards.

Guidelines: Each region sponsors a Try-Math-A-Lon team, which competes at the National Convention. The competition has three components: individualized mathematics progress assessment test, engineering contest and quiz bowl.
At the conclusion of the contest, the team with the most points from all three components is the national champion.
Deadline: Teams must be formed by NSBE Spring Regional Conferences to compete on the regional level in order to progress to the National Competition at the National Convention.
(Download the Try-Math-A-Lon Toolkit at www.nsbe.org (Pre-College Link).
Contact: Pre-College Initiative
Programs Associate
NSBE National Headquarters
(703) 549-2207, ext. 204

Engineering to Avoid Disaster



by Sheryl Nance Nash



There's been a lot of talk about heroes in the wake of the events of the September 11 attacks that led to the tragic loss of thousands of lives and devastation of the World Trade Center and the Pentagon. While firefighters, rescue workers and other volunteers are most visible, civil engineers toil among the rubble, too.

Engineers may be in the background, but they are playing an important role in the aftermath of the disaster. Engineers have worked around the clock at the World Trade Center site, advising search-and-rescue teams and helping contractors with demolition and site safety. They have also helped inspect many of the buildings in the surrounding area to assess whether they are safe.

"There are a lot of unsung heroes working on these issues," says Indranil Goswami, a professor of structural engineering at Morgan State University in Baltimore.

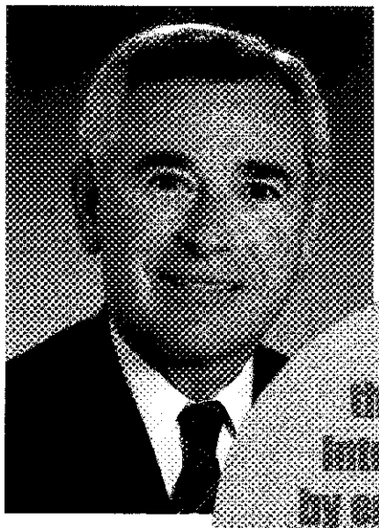
"There are a lot of unsung heroes working on these issues."

Indranil Goswami

Shyam Sunder, chief of the structures division at the National Institute of Standards and Technology in Gaithersburg, Md., explains what engineers typically do in times of crisis. "Engineers figure out what needs to be done, by whom, what type of equipment should be used in removing debris, generally, what precautions are in order," he says.

Then there's the "tagging" of buildings. After inspection, buildings receive colored tags that mark them as safe, unsafe for occupancy or okay to occupy after repairs or further investigation. To shed light on the enormity of the job, in one week engineering teams determined that 348 buildings near the WTC were okay, 13 badly damaged and 18 required limited facade repairs. And that was just round one.

Next, engineers try to assess what went wrong, technically – what caused the failure. In the case of a tornado for example, photographs of housing or uprooted trees may be taken to assess the magnitude of the event and how well buildings performed. There is a review of current building codes and a decision made as to whether they need upgrading. When it comes to earthquakes, says Don Goralski, a spokesperson for the Multi Disciplinary Center for Earthquake Engineering Research (MCEER) in Buffalo, N.Y., the following are key: ground motion, soil conditions at the site, when the building was constructed and whether it was up to code.



Ron Klemenic

"Engineers research the event and apply those lessons so that improvements can be made in the future," says Sunder.

Though the verdict is still out about the exact cause of the collapse of the WTC, the prime suspect is the heat from the fire. Some in the engineering community say the airplanes compromised the structural tube and the fires that followed burned to temperatures above the 1,500 to 1,600 degrees Fahrenheit that fireproof steel is designed to withstand.

> "Without the structural integrity created by engineers, many more thousands of lives would have been lost."
> —Ron Klemenic
> Council on Tall Buildings

The WTC had redundancy, meaning that although some pieces were damaged, others carried the weight for some time. That's one reason the buildings stood for as long as they did before crumbling. "Without the structural integrity created by engineers, many more thousands of lives would have been lost," says Ron Klemenic, chairman of the Council on Tall Buildings based in Bethlehem, Pa.

Already there is a national coalition of engineers forming to study the events at the WTC from a structural point of view. "We'll look at photos and videotapes to try to see, to understand, what occurred, why they collapsed. We want to be precise. We will use computer modeling simulation. What's also important is what went right. The buildings stood for more than an hour after the attack. Something went right, we want to replicate that. We will report to the industry our findings," says Klemencic.

Safety is always a top concern for engineers. Engineers create the supporting structures for the nation's buildings, bridges, tunnels and other public facilities as well as design heating and cooling systems. Though their handiwork is concealed by architecture, the structural systems they design and create are paramount – the glue that holds everything together. In their day-to-day duties, decisions are made that impact lives.

"We always design a set of criteria that have to be met, in terms of wind, earthquakes, hurricanes, whatever is appropriate in that area," explains Gerry Schwartz, president of the American Society of Civil Engineers in Washington, D.C.

For example, because earthquakes are not unusual in California, many of the buildings there have lots of redundancy to help them hold up better in an earthquake. In Florida, which is prone to hurricanes, many

roofs are designed with a reinforced connection to the walls. The criteria are established early in the design process. Factors like how many people will occupy the building, what kind of contents it will have and what temperatures might be reached if the building caught fire are among those taken into consideration. Decisions must be made about whether a building is best suited for a steel or concrete frame, and each member must be designed to withstand specified loads. Choices are made based on a fair number of calculations, according to Michel Bruneau, a steel structures expert who is deputy director of MCEER. Buildings are also designed to be "life safe" for a period, to allow people time to escape.

Things changed for just about everyone on September 11. Engineers are no exception. They face unique challenges. "We have to ask ourselves what are the worst-case scenarios we should be designing for," says James H. Johnson, Jr., a civil engineer who is dean of Howard University's school of engineering.

James H. Johnson, Jr.

The trouble is, "It's hard to design for all risks. You can't anticipate everything," points out Gregory Fenves, a professor of civil engineering at the University of California at Berkeley.

The big question, says Schwartz, is how to design for terrorism? "How do you protect against a terrorist? The method, means and extent is under the control of the terrorist."

"We have to ask ourselves what are the worst-case scenarios we should be designing for."
— James H. Johnson, Jr. Howard University

It's a pressing issue facing the engineering community. "My thinking is that we won't fortify buildings to protect them in the event of a missile attack, the terrorism issue will be dealt with in other areas like airport security," says Klemencic. But there could be some changes to beef up buildings so they withstand a ground level attack, for example. "You might see huge concrete flower pots in front of buildings that look nice, but they also serve as a bunker, a barrier to a car with a bomb. There might be all sorts of security enhancements to new buildings as well as retrofitting of existing buildings. We'll have to see," adds Klemencic.

One thing that is certain, there will be even more emphasis on safety. "We'll have to take a look at what is the vulnerability to the nation's bridges, tunnels, railways and water supply," says Schwartz.

Klemencic puts the challenge in perspective, "Engineers are problem-solvers, it'll come down to how much money is available, what people are willing to put up with in terms of convenience and other issues, to get the comfort level they feel is necessary."

That comfort level is key. "We have to win back the confidence of people who work in tall buildings. A sense of uneasiness may occur for some time," says Johnson.

To be sure, engineers will be hard at work finding new technologies to enhance their work. Neven Krstulovic-Opara, a researcher at North Carolina State University in Raleigh, is fine-tuning what he calls "super concrete." Because failure is inevitable in all structures, engineers have to design the best and safest way for a structure to fail. In conventional concrete systems, steel reinforcing bars (rebars) give the concrete tensile strength. But steel rusts over time and causes failures. For safety and design reasons, conventional concrete is designed so that the rebars fail before the concrete fails. However, Krstulovic-Opara's concrete system breaks that tradition. His super concrete is designed to prevent the separation of large pieces of concrete from the structure. When it fails, the pieces remain stuck together, held in place by the stainless steel fibers. Those that do break away are smaller and less likely to cause injury. Such emerging innovations could prove valuable weapons in an ever-changing world.

As Dean Johnson says, "Engineers take science information and use it for the betterment of mankind."

During National Engineers Week (February 18-24), all NSBE members and supporters are asked to commit to visit at least one elementary, junior or senior high school to introduce pre-college students to engineering as a career option. During this week, our goal is to reach 2,000 schools, and make an organization-wide impact on pre-college students!

The National Society of Black Engineers Pre-College Initiative (PCI) Program

national pciweek

February 17-23, 2002

Following are tips on how you can contribute to the success of "National PCI Week".

1. Don't do it alone! Partner with a team of NSBE alumni and student members to visit classrooms.
2. Compile a list of schools in your area to visit.
3. Learn about the school(s) you plan to approach. Are the students struggling academically, or are they on the math and science fast track?
4. Plan your classroom presentation. Tailor the format to fit your personality and experience to meet the school's need.
5. Encourage the junior and senior high schools to form a NSBE Jr. chapter.
6. Give testimonials on how being a member of NSBE has helped your academic or professional career.
7. Don't stop now, continue to serve as a mentor to the students.

NOTE

To order a FREE Engineers Week planning kit (complete with sample classroom experiments and a detailed implementation plan for classroom visits), call (412) 741-1353. Visit the website at www.eweek.org

Questions about the PCI program can be directed to NSBE Programs Department (703) 549-2207, ext 254 or visit www.nsbe.org/pci for NSBE Jr. Membership and Chapter chartering forms. Please complete and return the PCI Week evaluation form, which is also on our website.

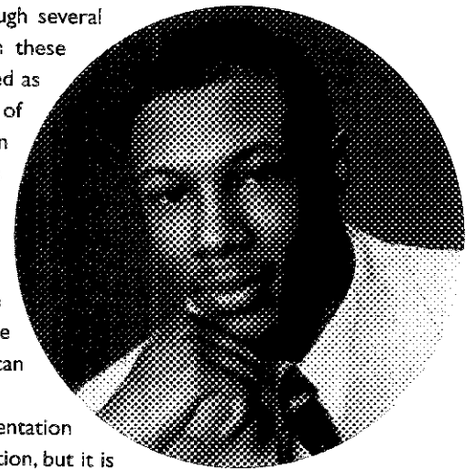
NSBE is a proud supporter of the National Engineers Week campaign, and encourages all members to support this initiative. If you can not participate during PCI Week, you can choose another day. There is no maximum or minimum to the number of schools you can visit. The important thing is to reach the students!

Transitioning From High School to College

Any engineer can tell you that preparing for a career in computer science and engineering starts long before college, even before high school in some cases. It was NSBE Jr. that prepared Michael Pamphlet for his freshman year at Morehouse College in Atlanta, where he is pursuing a dual degree in computer science and computer engineering.

Pamphlet happened upon NSBE Jr. while he was enrolled in a summer technology camp at Chicago State University. While in the ninth grade at Whitney M. Young High School in Chicago, he became a member of NSBE Jr. and became heavily involved in its programs. He even won NSBE's most prestigious scholarship, the Golden Torch Award. He attended the awards banquet that he describes as "almost like the Oscars or the Grammys." It is a black tie affair hosted by celebrities like Holly Robinson Peete and Vivica Fox.

In addition to awarding scholarships, NSBE Jr. challenges students through several types of contests and competitions. Pamphlet was an active participant in these competitions. He served on the team at the TRY-MATH-A-LON, and returned as a coach. In his senior year, Pamphlet made it all the way to the national level of the National PCI Science Fair and won a cash prize for an application of an artificial heart that is self-supportive (feeding on some of the same nutrients that humans survive on – proteins).



Michael Pamphlet

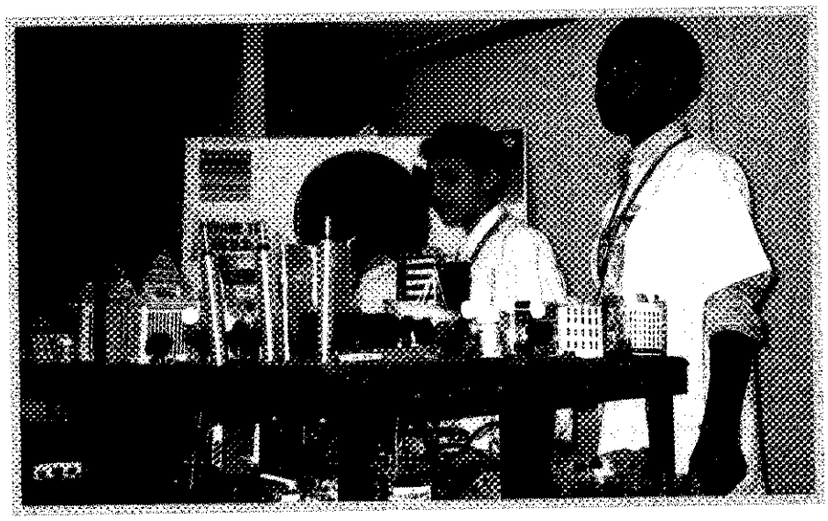
While NSBE is for primarily college students, NSBE Jr. is designed to expose and orient students in grades 6-12 to the world of engineering. The goals of NSBE Jr. are to help pre-college students develop a positive attitude towards academic excellence; stimulate enthusiasm about engineering science among pre-college students; raise cultural awareness among African American youth, and increase college graduation rates of African American students.

Pamphlet feels proud to be a part of the effort that increases the representation of minorities. For him, the organization is not just an extracurricular organization, but it is an opportunity to learn about the field and to learn the steps needed to become a successful professional. His fondness for the organization goes beyond his interest in science. The organization has provided a network of mentors and friends and a long-lasting bond.

In the near future, he plans to obtain an MBA and combine his interest of computer science and business. Pamphlet also finds community service very important and hopes to one day give back. For now, he is giving back as a role model for the next generation of engineers and computer scientists. But don't be fooled, Michael is no computer geek. In his spare time he likes to socialize and listen to R&B music and jazz. He cites R. Kelly, Carl Thomas and 112 as his favorites.

Since Jr. High School, NSBE Jr. has provided Pamphlet with an outlet for his interest in computer science and a place to hone his leadership skills. As a college freshman, he finds himself a role model for pre-college students and a budding leader on campus.

Your Imagination Is the Limit in NSBE Jr.



R.H. Terrell Junior High students Nicolas Cedra, Tobi Odunlami and Timothy Anderson present their projects.

What if you could imagine your world exactly the way that you would like to see it, making important decisions about a city with no limits with students as the creators. That's exactly what members of the NSBE jr. Chapter at R.H. Terrell Junior High School in Washington, DC are doing. In fact, their imagination about the ideal city won them the first place award during last year's Future City Competition, held each February during National Engineers Week. The competition is open to seventh and eight-grade students.

The small-scale model is the result of a large-scale concept, and the dedication of 25 of the chapter members who devote part of their summer and three days a week during the school year preparing for the competition. Their hard work paid off last year when students Nicolas Cerda, Tobi Odunlami and Timothy Anderson won the Regional Competition and each were showered with prizes including a plaque, $100, a medal, and the first place trophy which goes to the school. The Regional Competition was held at Howard University in Washington, DC.

Their success didn't end there. After winning first place, they later matched against 21 other regional winners in the National Competition, where they won a special award for "Best Protection of Environmental Resources."

Science teacher Lucius Stephenson serves as coach and Gregory Sean Mitchell, Ph.D., an electrical engineer serves as the engineer mentor for Future City, along with architect-engineer Tolu Oduniami.

"I explain to them that the results come from hard work," said Stephenson, who is also a gifted and talented teacher and SECME coordinator. "Students put in most of the effort. I administer a written test, verbal test, and the students who work the hardest go to the competition.

"I get the enjoyment out of seeing them be so successful. People say that kids are not ambitious. These NSBE Jr. members are. I enjoy seeing them excited."

They are well on their way to preparing their entry for this year's competition, with the theme, "How Do Engineers Manage Energy." The determined team is focused on winning first place at the National Competition.

"The members are very committed and exude a lot of energy relating to their professional aspirations," said Principal Francis Nicol, Ph.D. "It is the passion of Mr. Stephenson that brings about this excitement."

In addition to the Future City Competition, NSBE Jr. members have competed in the FIRST Lego competition, and have attended the NSBE National Convention for the last two years, where they've competed in a bridge building competition.

The NSBE Jr. chapter at Terrell has 75 members and is in its fourth year, with bragging rights of being the first recognized junior high school to become a NSBE Jr. chapter.

Along with the NSBE Jr. Chapter, Terrell Jr. High has many programs to encourage students including the Gifted and Talented Club, the Honors Society, The Metropolitan Consortium of Minorities in the Sciences, Engineering and Computers, and SECME, Inc., among others programs.

NSBE Pipeline

Region I

Greece Olympia H.S.
(Rochester, NY)
Hutchinson Central Technical H.S.
(Buffalo, NY)
A. Philip Randolph Campus H.S.
(New York, NY)
Benjamin Banneker Academy
(Brooklyn, NY)
John O'Bryant
(Boston, MA)
John F. Kennedy H.S.
(Bronx, NY)
Pope John XXIII H.S.
(Everett, MA)
Brooklyn Technical H.S.
(Brooklyn, NY)
Poughkeepsie H.S.
(Poughkeepsie, NY)
Science Skills Center H.S.
(Brooklyn, NY)
Hempstead H.S.
(Hempstead, NY)
Binghamton H.S.
(Binghamton, NY)
George Westinghouse H.S.
(Brooklyn, NY)
Liberty Partnership Program in the University at Albany
(Albany, NY)
Troy H.S.
(Troy, NY)
St. Benedict's Preparatory School
(Newark, NJ)
Aquinas Girls Secondary School
(Accra, Ghana, West Africa)
St. Louis Secondary School
(Kumasi, Ghana, West Africa)
Hill Regional Career H.S.
(New Haven, CT)
S.T.E.P./Purchase College
(Purchase, NY)
McKinley Vocational High School
(Buffalo, NY)

Region II

Page H.S.
(Greensboro, NC)
Schanley H.S.
(Pittsburgh, PA)
Northwestern Senior H.S.
(Hyattsville, MD)
Baltimore Polytechnic Institute
(Baltimore, MD)
Harding University H.S.
(Charlotte, NC)
Maryland MESA Program
(Laurel, MD)
Techworld Public Charter School
(Washington, DC)
Martinsville & Henry County
(Martinsville, VA)
R. H. Terrell Junior H.S.
(Washington, DC)
Greater Philadelphia Montgomery
(Philadelphia, PA)
Eleanor Roosevelt H.S.
(Greenbelt, MD)
West Charlotte H.S.
(Charlotte, NC)
Word of God Christian Academy
(Raleigh, NC)
Dudley H.S.
(Greensboro, NC)
Eastern Guilford H.S.
(Greensboro, NC)
South East Raleigh H.S.
(Raleigh, NC)
Woodrow Wilson Senior H.S.
(Washington, DC)
Southeast Halifax H.S.
(Halifax, NC)
Washington DC Metropolitan
(Washington, DC)
Oxon Hill H.S.
(Oxon Hill, MD)
Woodlawn H.S.
(Baltimore, MD)
Athens Drive H.S.
(Raleigh, NC)
George Washington H.S.
(Philadelphia, PA)
Tri-County
(Clemson, SC)
J.F.Webb High School
(Oxford, N.C.)
Newark High School
(Newark, DE)

Region III

Booker T. Washington H.S.
(Atlanta, GA)
Starkville H.S.
(Starkville, MS)
University of Louisville
(Louisville, KY)
Cedar Grove H.S.
(Ellenwood, GA)
Hume-Fogg Academic
Magnet
(Nashville, TN)
Booker T. Washington H.S.
(Tuskegee, AL)
Westside H.S.
(Macon, GA)
Stranahan H.S.
(Ft. Lauderdale, FL)
Tampa Bay Technical H.S.
(Tampa, FL)
Eastside H.S.
(Gainesville, FL)
Dunbar H.S.
(Lexington, KY)
Redan H.S.
(Stone Mountain, GA)
Monroe Comprehensive H.S.
(Albany, GA)
LAMP H.S.
(Montgomery, AL)
W. D. Mohammed H.S.
(Atlanta, GA)
Tennessee State Univ. Jr.
(Nashville, TN)
Towers H.S.
(Decatur, GA)
Florida A&M U./FSU Jr.
(Tallahassee, FL)
Tuskegee Institute Middle
(Tuskegee, AL)
J.O. Johnson H.S.
(Huntsville, AL)
Lassiter H.S.
(Marietta, GA)

Region IV

Chicago State U.
(Chicago, IL)
Hughes Alternative Center
(Cincinnati, OH)
St. Xavier H.S.
(Cincinnati, OH)
Walnut Hills H.S.
(Cincinnati, OH)
Milwaukee Wisconsin Jr.
(Milwaukee, WI)
Cass Technical H.S.
(Detroit, MI)
Meadowdale H.S.
(Chicago, IL)
Hyde Park Academy
(Chicago, IL)
Muhammad University-Islam
(Chicago, IL)
Aiken H.S.
(Cincinnati, OH)
Reading Jr./Sr. H.S.
(Reading, OH)
Trotwood-Madison H.S.
(Hamilton, OH)
Wylie E. Groves H.S.
(Beverly Hills, MI)
Illinois Math and Science Academy
(Aurora, IL)
West Side H.S.
(Gary, IN)
Jefferson H.S.
(Dayton, OH)
Focus Hope Machinist Institute
(Detroit, MI)
Southfield Senior High School
(Southfield, MI)

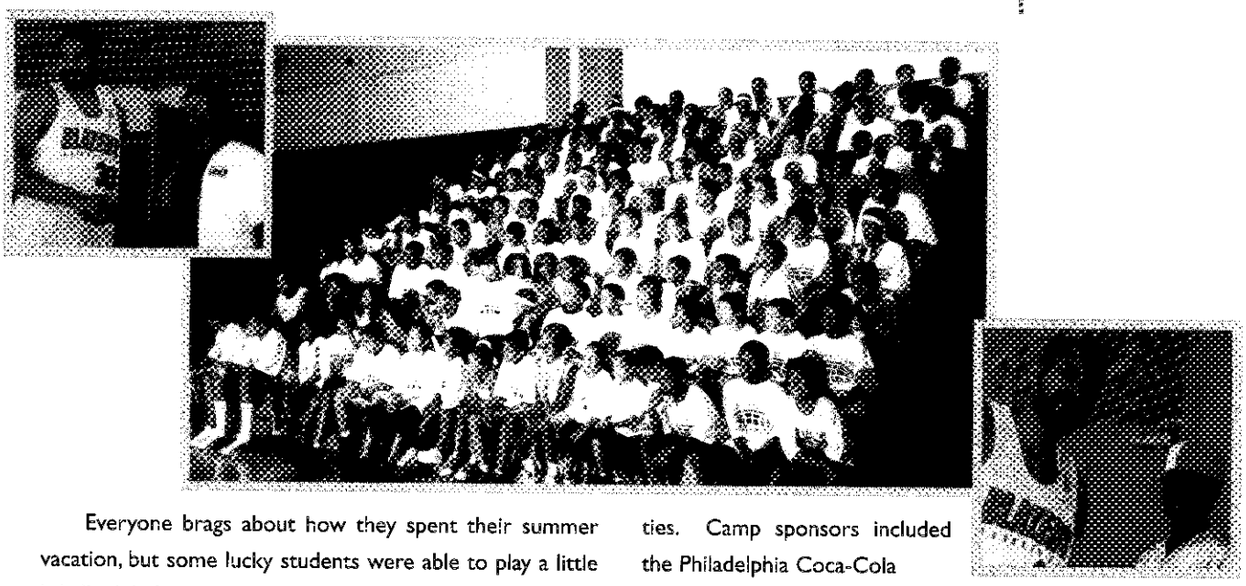
Region V

Metro Academic &
Classical Academy
(St. Louis, MO)
St. Augustine H.S.
(New Orleans, LA)
A&M Consolidated H.S.
(College Station, TX)
James Madison Senior H.S.
(Houston, TX)
Jesse H. Jones H.S.
(Houston, TX)
Booker T. Washington H.S.
(Houston, TX)
Dunbar H.S.
(Fort Worth, TX)
Dunbar Middle School
(Fort Worth, TX)
Lyndon B. Johnson H.S.
(Austin, TX)
Northside H.S.
(Lafayette, LA)
Lawrence H.S.
(Lawrence, KS)
Xavier Preparatory H.S.
(New Orleans, LA)
Lincoln College Preparatory
Academy
(Kansas City, MO)
St. Mary's Academy
(New Orleans, LA)
Bryan H.S.
(Bryan, TX)
Lincoln H.S.
(Dallas, TX)
Normandy Senior H.S.
(St. Louis, MO)
Louisiana State University at Large
(Baton Rouge, LA)
Worthing Senior H.S.
(Houston, TX)
Forest Brook H.S.
(Houston, TX)
Estacado H.S.
(Lubbock, TX)

Region VI

Garfield H.S.
(Seattle, WA)
Tucson Magnet H.S.
(Tucson, AZ)
Greater Albuquerque
(Albuquerque, NM)
George Washington H.S.
(Denver, CO)
Highland H.S.
(Albuquerque, NM)
Skyline H.S.
(Oakland, CA)
Eastside College Preparatory Academy
(East Palo Alto, CA)
Palisades Charter H.S.
(Pacific Palisades, CA)
Venice H.S.
(Los Angeles, CA)
Forshay Learning Center
(Los Angeles, CA)
Southwest Middle
College H.S.
(Los Angeles, CA)
Saturday Science and Math Academy
(Albuquerque, NM)

B-ball and Engineering Can Go Hand-in-Hand at the Rasheed Wallace Basketball Camp



Everyone brags about how they spent their summer vacation, but some lucky students were able to play a little b-ball while learning about careers from working engineers and other professionals. More than 200 students in grades 7-12 attended the Rasheed A. Wallace Basketball Camp held in Philadelphia, Pa., July 2-6. The camp is designed to boost self-esteem and provide students with a positive environment to channel their energy.

Students had the opportunity to hear from guest speakers from various backgrounds including Brian Dorsey, general engineer/professional college recruiting representative at NAVSEA Dahlgren Naval Surface Warfare Center. Dorsey, a NSBE Alumni Extension member, joined with NAVSEA Dahlgren to provide students attending the camp with company information, NSBE Pre-College Initiative information, *Bridge* magazines, and NCAA handbooks. Dorsey spoke to students about transitioning into college, choosing engineering or science as a major, and about some of the exciting things that engineers do. The sixth annual camp was held at Simon Gratz High School, Wallace's alma mater.

The Rasheed A. Wallace Foundation was established in 1997 to promote social and cultural programs that enhance the quality of life for all people and assist in the recreational and educational development of youth in Philadelphia, Portland, Ore.; Durham, N.C.; and other selected communities. Camp sponsors included the Philadelphia Coca-Cola

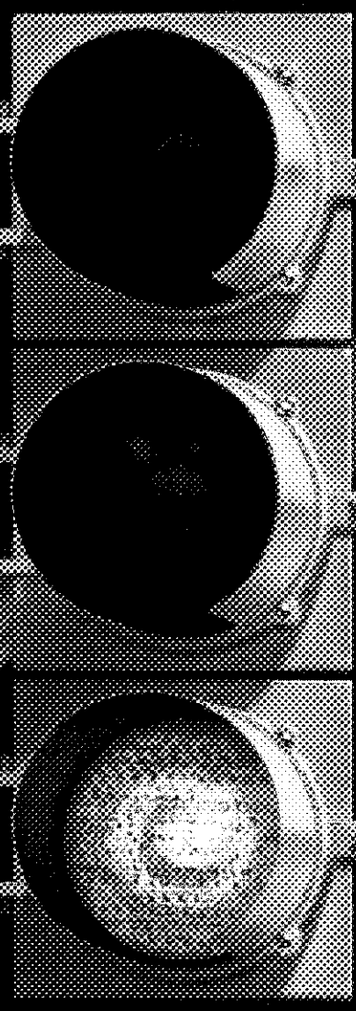
Wallace began his basketball career in Philadelphia at Simon Gratz High School, where he was named *USA Today* High School Player of the Year after the 1992-93 season and selected first team All America by *Basketball Times*. Despite limited playing time of just 19 minutes per game, he still managed to average 16 points, 15 rebounds and 7 blocks per game during his senior year. In addition to basketball, Wallace also ran track and was a high-jumper.

Legendary University of North Carolina coach Dean Smith lured Wallace to play at the school in Chapel Hill, N.C. During his time there, Wallace had tremendous success leading the Tar Heels to the NCAA Final Four in 1995. He left North Carolina to enter the 1995 NBA Draft after his sophomore season. Wallace was selected in the first round, fourth pick overall by the Washington Bullets, now known as the Wizards.

He was traded to the Portland Trail Blazers, where he led the Blazers in scoring 12 times, and also ranked third in the league in field goal percentage. The young superstar signed a long-term contract to stay in Portland.

Wallace has committed himself to giving on and off the basketball court. His commitment to developing junior and high students for professional careers is a part of his legacy of which he is especially proud.

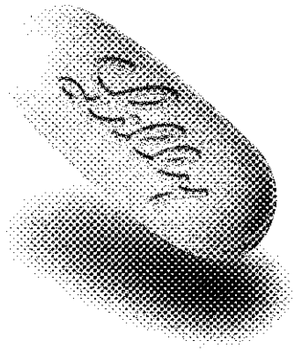
NATIONAL ENGINEERS WEEK



Feb. 17-23, 2002

Without Engineers the World Stops

www.eweek.org



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YOUTH RECOGNITION: FEB. 12, 2002

The group is the American Society of Black Engineers, Alexandria Student Chapter. They were highlighted in the recent issue of the society's magazine "Bridges". The students are from the STEP program and T.C. Williams High School. They were recognized because of their diversity. Mr. John Nunn is their advisor and also a teacher at STEP. This after school program promotes careers in advanced math, science and engineering. On Friday, the students will attend a conference in Baltimore where students will have an opportunity to meet with various companies and also explore college programs, internships etc. He will bring approximately 5 of his students with him.

(John Nunn may be reached at 824-6631.)